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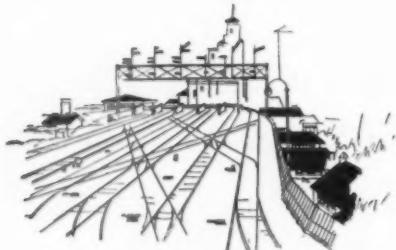
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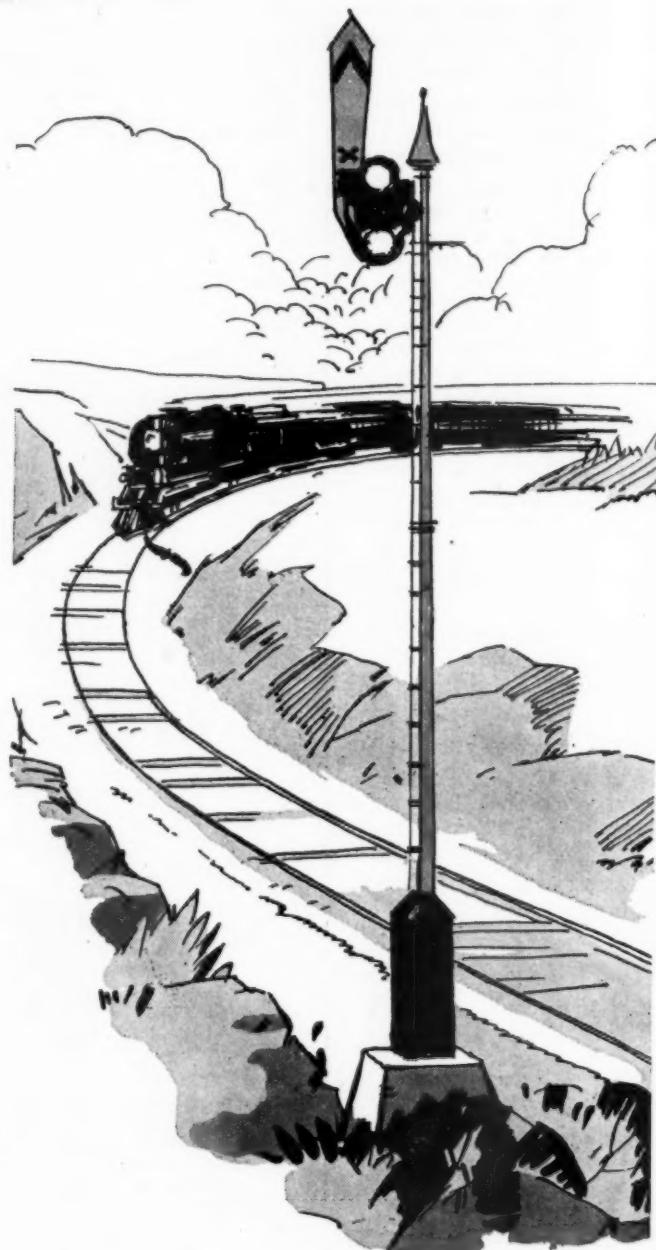
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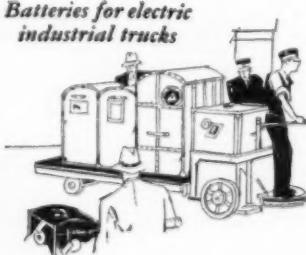
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Railway Age

Vol. 86, No. 20

May 18, 1929

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The Significance of the Grain Rate Reductions

THE nation-wide reduction of railway grain rates, and the way it is being brought about, illustrate strikingly the unique relations which are growing up between the railways, on the one hand, and the government and the other industries of the country, on the other hand.

The railways were not responsible for the great accumulation of wheat that occurred on farms and in elevators in the west. They contributed nothing toward the over-production of wheat in this and other countries. They were fully equipped and prepared at all times to transport the wheat produced in this country to any markets or ports to which those holding it might have chosen to ship it. Their rates upon grain recently have been thoroughly investigated by the Interstate Commerce Commission without any decision having been reached that they were too high. Nevertheless, the federal administration appealed to the railways to make a general reduction of their rates on export wheat. It was evidently assumed that this would tend to cause a sufficient increase in the price offered for wheat to those who are holding it to influence them immediately to ship it in large quantities.

Almost the only effect which it was certain the reduction in rates would produce was a reduction in railway earnings. In other words, it would result in a subsidy being paid by the stockholders of the railways either to the shippers of the wheat, in the form of an increase in the price received by them, or to the foreign purchasers of it in the form of a reduction in the price paid by them.

The announcement of the reduction in rates actually has been accompanied and followed by a decline in wheat prices in the markets of the world exceeding the reduction in rates. If only the same reduction in price would have occurred if no reduction in rates had been announced, those holding the wheat will benefit to the extent of the reduction in rates. On the other hand, if the decline in price of wheat shall exceed the decline that otherwise would have occurred to an amount equal to the reduction in rates, the entire benefit of the reduction in the rates will go to the foreign purchasers of wheat.

Why No Help From Other Industries?

Assuming the entire benefit of the reduction in rates will accrue to the producers and shippers of wheat in the United States—an assumption which unquestionably is contrary to the facts—why should the railways have been asked or expected to make it? Most of the railways are this year earning larger net returns than in any year since the war. In the first quarter of 1926, their best year since the war, they earned at the annual

rate of 4.80 per cent on their property investment, while in the first quarter of this year they earned at the annual rate of 5.37 per cent. They do not, however, owe the improvement in their financial results to the fostering care of the government.

The Transportation Act provided that their freight rates should be so adjusted by the Interstate Commerce Commission as to enable them to earn a fair return, which the Commission held would be 5½ per cent annually upon their valuation. Actually, their rates have been so regulated that they have not yet earned this return. The reductions of rates ordered by the commission in 1922 made them so low that it has required seven years of the most skillful management the railways ever had to enable them to secure the financial results now being reported.

The facts regarding earnings, operating expenses and taxes in the first quarters of 1926 and 1929 illustrate what has been occurring. The total earning of the Class I roads in the first quarter of this year were about \$8,000,000 larger than in the first quarter of 1926. Their taxes, however, were over \$7,500,000 larger, the net result being that the public took back in increased taxes almost all that it paid in increased earnings for the handling of a larger freight traffic. The net operating income earned represented an increase of about \$37,000,000 over the first quarter of 1926, but it was entirely due to a reduction of operating expenses that was secured in spite of advances in wages.

It may be said that the prosperity of the railroads and agriculture are interdependent, and that the railroads ought to help agriculture when it is in distress and when they are comparatively prosperous. But many of the manufacturing and other industries of the country are as dependent upon the farmers for business as are the railroads, and many of these other industries are relatively much more prosperous than the railroads. Why, then, should the railroads be called upon to subsidize agriculture at the expense of their stockholders when no other industry is called upon to do so? Is it because the government does more to promote the prosperity of the railroads than that of other industries? Exactly the contrary is true.

The government restricts the profits of the railways as it does not those of any other large industry. It subsidizes competition with them as it does not with any other industry, being engaged now in spending billions of dollars in improving highways and waterways upon which other carriers operate without paying adequately for their use or submitting to such regulation of their service and rates as the railways do. The federal government is engaged in direct competition with the railways through its ownership and operation of the barge line upon the Mississippi river system.

In other words, the railroads are the only industry with which the government is engaging directly in competition, and they are likewise the only industry which it is asking to subsidize agriculture at the expense of its stockholders.

Precedents Being Established

Future developments will have to settle whether, from a railway standpoint, the reductions being made in the rates on grain are justified. Perhaps federal administration will show its appreciation of what is being done by favoring a fairer and more constructive policy of railway regulation than has heretofore been followed. Perhaps the farmers and their spokesmen in private and public life will manifest a more friendly feeling toward the railways because they are the only industry which has deliberately and voluntarily sacrificed part of its earnings in an effort to help agriculture.

The fact should not be disregarded, however, that precedents are being established in the dealings of the government with the railways which may be cited for highly undesirable purposes and with very undesirable results in the future. Although general business is almost phenomenally active at present and the volume of freight traffic being handled is greater than ever before, the railroad industry as a whole is earning only approximately the so-called fair return. As the railways are now being called upon to make sacrifices of their earnings in an attempt to help relieve a situation created by the over-production of wheat, why cannot they, with equal reason, be called upon in future to take similar action to relieve an emergency due to an over-production of some other farm product? Why can they not, with equal reason, be called upon to sacrifice their earnings to aid any industry that gets into trouble?

Is the government going to continue to subsidize competition with the railways and, at the same time, call upon the railways to subsidize other industries? These are questions of great importance. It should be plain that, in the long run, the railroad industry cannot prosper if the precedents now being established, of having the government subsidize competition with it, and, at the same time, call upon it to subsidize other industries, are to be followed in future in important cases. There is a great and growing need for study of the economics of transportation by business men and public men, and for the application by the government of sound principles of economics in its development and regulation of means of transportation.

A Wholesome Tendency

THE railroads are not infrequently accused of a dogmatic attitude toward some of the moot problems of engineering and construction. Thus, it is shown that one railroad defends its adherence to one type of construction with the same degree of positive assurance that another upholds its use of some other design intended to obtain the same results. That a greater degree of open-mindedness is now manifest is illustrated by the fact that one large system with a most complete and distinctive system of track standards has recently made a test installation of rails and rail joints purchased to the standards of one of its leading competitors. The latter, on the other hand, has instituted a test of track fastenings that comprise a distinct departure from its own established standards. A third railway has recently

purchased a trial tonnage of 60-ft. rails with a view to ascertaining what advantages, if any, will accrue from the reduction in the number of joints thus affected. This inquiring attitude is one that should be fostered.

The Fuel Association A Constructive Influence

NO one who attended the recent annual convention of the International Railway Fuel Association at Chicago, witnessing the enthusiasm displayed and listening to the carefully prepared addresses and committee reports, could doubt that the inspirational and educational work of the association makes it a constructive influence in reducing the railway fuel bill. The total registration at the convention, a report of which appears elsewhere in this issue, was about 2,200 members and guests. Four railroad presidents and two superintendents of motive power addressed the association during the course of the four-day convention. Eight individual addresses were presented and 15 committee reports. The keynote of the convention was the urge to further intensive efforts in securing fuel economy, perhaps best expressed in an unusually apt illustration taken from the address by R. H. Aishton, president of the American Railway Association. Mr. Aishton likened past accomplishments in saving fuel to shaking an apple tree loaded with ripe fruit. He said that is what railroad men have been doing for the past few years, but that they can get no more apples by shaking the tree and must go after them with a ladder and pick them off by hand. That is the job which Mr. Aishton said lies before the association members, as well as all other railroad officers interested in promoting fuel economy and hence more efficient railroad operation.

How Gage the Efficiency of a Traffic Solicitor?

ALMOST any commodity which has any use at all can be disposed of in considerable bulk if the price is made sufficiently low. The real test of the success of an enterprise, however, is not its gross business, but its net earnings. No one would think highly of the merchandising skill of a department store manager who doubled his sales by reducing prices until the margin of profit approached zero. Yet is there not a certain tendency with railroads to gage the efficiency of their traffic solicitors on much the same basis—i.e., the number of carloads of freight which they can secure? Traffic men are constantly besieged by their patrons to endeavor to secure rate adjustments for certain commodities and routes. There is nothing wrong with rate changes *per se*, because some of them may occasionally actually stimulate business, not alone for one railroad but for all, and, with a smaller margin of profit per ton, actually bring increased net returns. But how many of the countless rate "adjustments"—downward—which are continually being made actually have this effect? Rate "adjustments"—downward—on a particular commodity initiated by Railroad A may bring an increased tonnage to it at the expense of Railroad B, because of the shipper's gratitudo, even though Railroad B has to meet the lower rate. But Railroad B may retaliate by a similar reduction on an-

other commodity which Road A will have to meet. The only result of such rate adjustments is reduced net earnings for all the railroads. Might not the efficiency of a traffic solicitor be more accurately gaged by counting for his record only that business secured without any change in the rate basis? The traffic man who can secure and hold business without making constant recommendations for rate adjustments in favor of his patrons should not be handicapped by having his record compared with that of another who concentrates on total tonnage without counting the cost.

The Dispatcher's Job

WITH the advent of automatic signaling, train control, the extension of double track and other safeguards, the dispatcher's job is now much less of a strain than it was formerly. However, it is not yet, by any means, a sinecure. One of the most productive sources of nervousness is eye strain. Many railroads, realizing this, have provided light and airy offices for the dispatching force, and at least one railroad supplies a special grade of paper for train sheets that does not reflect the glare under any light. The dispatchers' working quarters are important, and the modern trend toward improving them is a commendable one.

Containers in Britain Attract Traffic Without Rate Concessions

DOOR-TO-DOOR transit of goods by railway containers has passed the experimental stage, and in the Yorkshire area a gratifying measure of success has been achieved," says a recent article in *Modern Transport* (London). The containers referred to are of three general types: The first, an enclosed container with a capacity of $2\frac{1}{2}$ tons; the second, likewise enclosed but capable of carrying four tons, and the third, also of four tons capacity but an open type. "The merchants," the article continues, "have expressed satisfaction with the scheme, which gives many of the advantages of a private siding, minimizes the risk of damage and pilferage, saves handling and effects considerable economy in packing, in the cost of packing materials, and in the carriage thereof. On their part, the railway companies have seen a return for their outlay in a steady but appreciable return to rail of traffic which ordinary conveyance had failed to retain. The loss of revenue in respect of the packing thus displaced led the companies to add a percentage charge to the rates for traffic so conveyed . . . usually representing less than the savings effected on packing costs, the supplement is considered a reasonable business arrangement." The foregoing information is timely when the container policies of American railroads are forming and also because of the interest in the recent container service investigation of the Interstate Commerce Commission. Much of the controversy at the hearings in connection with this investigation centered around the proposed container-mile rates and their tendency to cut class rates. In Great Britain, at least, there is evidence that the container handling method has sufficient merit to attract traffic, not only without rate concessions, but actually with an additional charge for its use.

An Anomaly

FOR nearly ten years the railways have been experiencing a constant decline in passenger traffic until the volume is now only two-thirds of that handled in 1920. In this same period they have seen a competing service develop on highways built and maintained at public expense and with terminal space provided by the cities on public streets. More recently, municipalities have begun to spend public money in large amounts for airports to foster another competitor of the railways in the transportation of passengers, yet many of these same cities are loud in their denunciation of the railways which have long given their communities passenger service, because they hesitate to provide new and ultra-modern terminals to serve a declining traffic.

Indicative of the trend in these improvements is the station which the New York Central will place in service at Buffalo on June 23. This structure, as described on a following page, is so located as to permit of an important operating advantage by reason of the fact that it allows through trains of the owning road to make a station stop without a reverse movement, such as is now required at the Exchange Street station. The primary purpose of the expenditure, however, is to satisfy the demand of this city for a terminal comparable with those provided at other cities. Its construction, therefore, affords a new standard on which other cities can base their pleas.

If the problem were confined to Buffalo, it would not be so serious, even though it has necessitated the construction of three stations in that one city within a few years. But it is nationwide. At Cleveland, the same road was long under attack by civic interests until it joined with other roads in the expenditure of sixty million dollars for complete new facilities. Again at Cincinnati, the New York Central Lines, in common with the other roads serving that community, have yielded to public demand and are now starting work on a complete new terminal that will cost more than thirty million dollars. At Pittsburgh the Pennsylvania has been negotiating with the city for the reconstruction of its facilities, while Fort Worth, Tex., is demanding the complete rebuilding of its passenger terminals. At New Orleans, La., the civic agencies have been insistent on a new arrangement of passenger terminals, and the Illinois Central is now working on plans for the reconstruction of the facilities for its service and that of several tenant roads. At Chicago the same road is under contract with the city to rebuild its main passenger terminal at Twelfth street, as well as its principal suburban terminal at Randolph street, at a combined cost of possibly twenty million dollars, while the city is insistent that the roads using the present Polk Street, LaSalle Street, and Grand Central stations likewise rebuild their facilities at an expenditure of more than one hundred million dollars. On the Pacific Coast the city of Los Angeles has been in litigation with the railways serving that community for years in an effort to force them to rebuild and consolidate their facilities in a new location selected by the city and unacceptable to the roads.

These examples might be multiplied at length. They are sufficient, however, to illustrate the utter inconsistency of the urban public in its attitude toward the newer modes of travel and that which it manifests toward the old, established agency of travel which has been so largely responsible for the growth of our great cities. They illustrate, also, the magnitude of the demand on the resources of the roads for facilities to serve a traffic that produces less than one-fifth of their revenues.



600-Hp., Double Power Plant, Combination Passenger and Baggage Car

Rail Motor Cars from a Builder's Point of View*

Economic operation and low maintenance costs are dependent on good design and the proper selection and co-ordination of accessories

By Charles O. Guernsey

Chief Engineer, Automotive Car Division, J. G. Brill Company, Philadelphia, Pa.

THE use of the internal combustion engine by the railroads has increased very largely during the past few years. Engines of all types and sizes are used for almost every conceivable purpose, from a small single-cylinder, air-cooled engine on an inspection car up to a 2,660-hp. Diesel-engine driven locomotive. Probably the most important application of the internal combustion engine on the railroad lies in the field of the rail motor car. In this field the scope of application is far greater than any advocate of this equipment would have predicted as recently as five years ago.

The success of rail motor cars depends on the manufacture, the mechanical department of the railroad and the proper application of equipment to the service, which is usually in the hands of operating officers. These three classifications might be spoken of as design, application and maintenance.

The design is and properly should be the function of the manufacturer. By reason of the engineering, sales and servicing staff which he maintains, he is constantly in touch with rail motor equipment throughout the world and is in a position to profit from experience gained in all sorts of applications. Furthermore, since the manufacturer is selling his product to many different railroads to meet many different conditions, he is compelled to spend large sums in development work far beyond what any given railroad might reasonably spend for the same sort of development. Also, by reason of the time and care which the manufacturer can and does necessarily take in the development of new apparatus, he is able to turn out a properly co-ordinated, well-balanced unit, which would hardly be possible for any railroad to do without undue expense, test and experimentation.

The most important of the three factors entering into successful operation is maintenance. The burden of the job is and properly should be carried by the mechanical officers of the railroad. It is not the purpose to dwell on this phase at any length, but it does seem advisable to point out that on an internal-combustion engine and, for that matter, on the transmission equipment as well, if the proper thing is done at the proper time, maintenance expense can be kept surprisingly low, whereas, if some minor adjustment is neglected, heavy expense may follow. In this respect this equipment differs rather widely from steam equipment. The steam engine can be operated, inefficiently it is true, but nevertheless without failure, even though much needed repairs are postponed. If some very minor inspection functions on internal-combustion equipment are neglected, comparatively heavy repairs may be required, or if not, at least failure on the road will result.

Selection of Equipment

Obviously, no one size or type of equipment will meet all varying conditions of service any more than a given type of steam locomotive meets all types of steam service. The equipment must vary in size and in the relation between tractive force on the one hand and speed on the other, depending on the particular service in which it is to be used. Any given class of equipment will, however, not operate economically outside its own classification any more than will a steam locomotive.

This matter of classification obviously brings up the question of rating of equipment. With steam locomotives it is quite common to make classification on the basis of bore and stroke of cylinders, boiler pressure, diameter of drivers and weight on drivers. With the above information, a fairly definite picture of the performance ability of a steam locomotive is given. Un-

*Abstract of a paper presented before the meeting of the Milwaukee Section of the Society of Automotive Engineers, held May 8, 1929.

fortunately, the internal-combustion engine can not be rated on such an arbitrary basis.

Naturally, the engines cannot be expected throughout their life to develop the very maximum of horsepower which has been developed under laboratory conditions. It seems, therefore, that a service rating should be given these power plants somewhat below the power actually developed on test. I propose as a simple and workable means of rating that the engine be rated at a speed which the manufacturer is willing to guarantee for continuous duty and that it be rated at 90 per cent of the actual power delivered on test when operating at that speed. Experience has demonstrated that carefully designed engines can be expected to maintain within 10 per cent of their maximum power when new, throughout their life, without an excessive amount of maintenance.

Service Conditions Favorable

The service in rail motor cars is less severe than in many other applications because of the manner of support. Such vibrations as are encountered are less serious than is the case in industrial, motor-truck or tractor applications. The application is also very desirable for the reason that the engine drives a generator, which in turn drives electric motors, thus giving an elastic connection between the engine and its ultimate load with the obvious advantage of freedom from torsional shocks. The engine is required to operate at wide open throttle only at its designed speed.

In many respects, however, this service is extremely severe. The engines are expected to operate for long periods between overhauls. We have set as a goal 6,000 hours, which is equivalent to about 150,000 miles, or about two years' service. Many engines are now being operated as much as 120,000 miles between overhaul periods, and a considerable number for longer periods. They should be capable of operating from 25,000 to 30,000 miles, or about 1,000 hours, between valve grinding.

Important Design Factors

Some of the points in design which seem to be necessary to meet the above conditions are as follows:

(1)—The combustion chamber, valves and pistons must be thoroughly cooled. This points to the use of aluminum pistons, carefully designed combustion chamber, extremely good circulation of water around the combustion chamber and, in the case of engines over five inch bore, to the use of twin exhaust valves. The cooler the exhaust valves can be kept the longer will be the time between regrinding valves, and the higher the compression can be run, other things being equal; consequently the higher the power which can be taken from the engine. The heat of the valve head is taken primarily through the seat. The area of the valve head exposed to heat goes up with the square of the diameter,

whereas the cooling surface increases only in direct proportion to the diameter. Therefore, the smaller the valve, the more will be the cooling surface on the seat in proportion to total exposed area. It has been demonstrated that engines with twin valves can be operated without detonation at mean effective pressures well above 100 lb. per sq. in., whereas an engine of the same size and having otherwise the same general characteristics of combustion chamber, but with a single exhaust valve, would detonate severely at much lower ratings.

(2)—Considering overhead-valve type engines, which have been generally used in this field, the use of twin intake valves fits well into the design and makes for interchangeability between the intake and exhaust valves. It also makes possible a considerably greater intake-valve port area with a reasonable lift, than is possible with one large valve.

(3)—The use of a proper oil filter is extremely important. If a good oil is used and is maintained at the proper temperatures, the matter of oil changing becomes purely a matter of contamination or dirt, rather than a question of dilution, assuming gasoline to be used as a fuel. With the use of a good filter, satisfactory results have been obtained over a period of years, with the oil changed on a schedule of 4,000 miles.

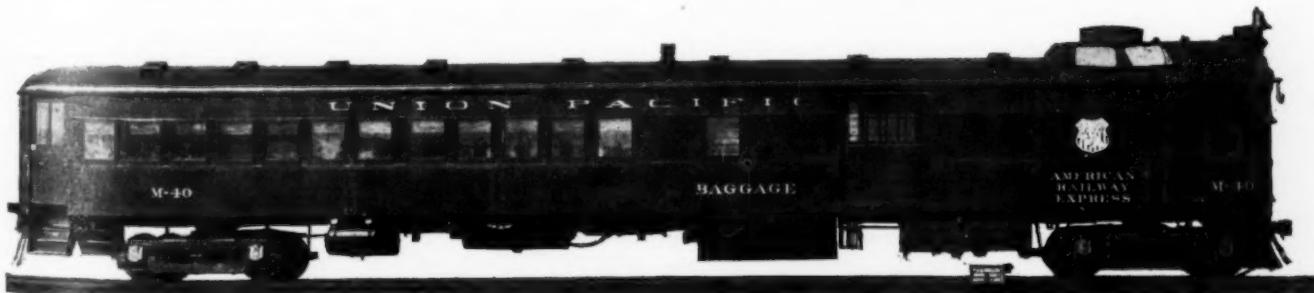
(4)—The weight of the engine should be kept as low as consistent with the above requirements as to life. Life should not be sacrificed to achieve low weight, yet the mere fact that an engine is heavy does not insure long life. Good designs in general use at the present moment weigh about 15 lb. per service rated horsepower.

(5)—The engine should be designed for the highest compression and highest mean effective pressure which it can be depended upon to deliver smoothly and without trouble from detonation and related causes, as obviously the higher will be the power output; but more important, the higher will be the fuel economy. This requires, however, the use of careful design throughout, and does undoubtedly increase the per pound or per horsepower cost of building the engine.

(6)—The ignition should preferably be of the magneto type and in duplicate so that if for any reason one magneto fails, the other will enable the operator to complete the run. This is preferable to battery ignition, principally because the voltage available in the primary battery ignition circuit will vary between 14 or 15 volts when cranking the engine on a cold morning, and 45 to 50 volts if the battery is being charged at a high rate.

(7)—On six- and eight-cylinder engines, multiple carburetion gives best results, both as to economy and power.

(8)—The cooling system should be so designed that the car will cool equally well in either direction and equally well at any car speed. Preferably the air circulation for cooling should be handled by forced draft,



Brill Single Power-Plant Passenger-Baggage Gas-Electric Car

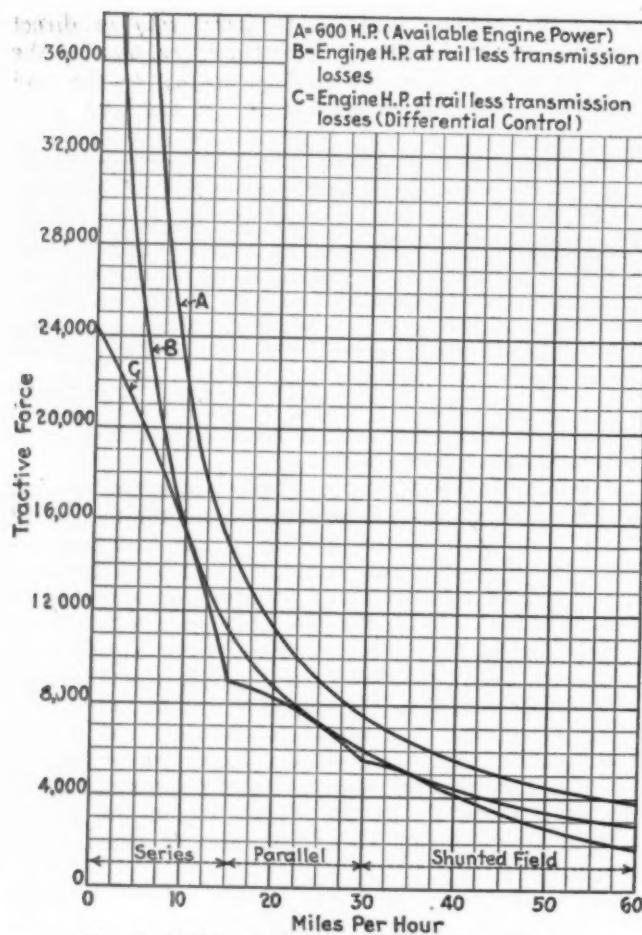


Fig. 1—Relation of Speed to Tractive Force

and the fan should be electrically driven, with variable-speed control so that the fan can be properly set to suit atmospheric temperatures and need not, thereafter, be altered if the cooling system meets the requirements just set forth.

(9)—The exhaust gases should be so discharged that they will not be drawn into the car windows. This has been satisfactorily arranged by causing the exhaust gases to be driven upward by the discharge of the cooling fans.

(10)—For reasons of safety, the fuel feed should be by means of a pump, vacuum system or other similar device, owing to the fire hazard incident to the use of gravity or pressure systems.

The Transmission

The question of transmission and the handling of accessories is also important. At the present time, all cars built for the American market, having more than 200 hp., are arranged with electric transmission. Entirely satisfactory results have been obtained with mechanical transmission on cars below this size.

In essentials, these electric transmissions are all alike. In each case, the engine drives a direct-current generator, which in turn transmits power to one or more series motors. The variation between different systems comes in the means of handling the accessories, the generator control and the switch gear for properly connecting the traction motors; i. e., reverse or forward, and series, parallel or shunted field connections of the traction motors. In the matter of motor connections, the simplest scheme is the so-called "K" control, in which the operator manually moves a controller, setting up power circuits directly in the proper fashion. This

has been used particularly where low first cost was a serious factor. In the other system, the motor connections are handled by contactors remotely controlled from the operator's position.

This type of control is universally used where heavy currents are to be handled, as for instance, in electric locomotive applications. It has the disadvantage of somewhat higher first cost and a somewhat more complicated wiring diagram, but has advantages in that 600-volt current can be kept entirely away from the operator and further in that contacts are made or broken at high speed and are maintained under high pressure, thus reducing the tendency to burn. Both systems have given good results.

With the trend to constantly increasing horsepower, the contactor or remote type will undoubtedly gain favor for the reasons given. This arrangement has a further advantage in case of double-end control or double-power-plant cars, in that the cables for carrying heavy current need not be carried throughout the length of the car, as is the case with "K" control. This equipment has the further advantage in that transition can be made from series to parallel connections of the motors without closing the engine throttle.

The function of the electrical transmission is obviously to transmit the full power of the engine to the wheels at all times, regardless of car speed, motor connections, or other conditions outside the engine. With differential control of the generator field, such as has been generally used by all builders in the present market, the inherent characteristics of the generator and of the traction motors prevent full utilization of the engine horsepower at all times, although it does approximate it.

Explanation of Charts

Fig. 1 (Line A) indicates the full power of a 600-hp. engine in terms of tractive force against speed, assuming there were no losses in transmission. Line B indicates the power which would be delivered to the wheels, allowing for electrical losses but assuming full utilization of the engine. Line C indicates the amount of power actually delivered to the wheels on a typical differential-control electric transmission. The combined efficiency of the generator and motors is practically as high as can be expected, but the space between Lines B and C indicates that a material increase in utilization is possible at certain points.

Fig. 2, in which A, B and C represent, respectively, the same values as in Fig. 1, brings out this point even more forcibly. In this case horsepower is plotted against miles per hour.

With full utilization of the engine, and assuming an acceleration from 5 to 60 m. p. h., an average of about 77 per cent of the engine horsepower is delivered at the rails. The performance below 5 m. p. h. can be improved slightly with full utilization, but is relatively unimportant due to the short space of time that the operation is within this zone. With the differential-control equipment, as in the example given, during such acceleration the average utilization is 68.5 per cent. The difference between the two represents a gain during such acceleration of 8.5 per cent. This does not necessarily mean that there would be 8.5 per cent difference in schedule performance, as during the bulk of the time on an ordinary schedule the operating speed would be somewhere between 25 and 60 m.p.h. Even under such conditions, however, there is a marked improvement, probably amounting to five per cent.

Rail cars ordinarily are applied in such a way that

there is a reasonable margin of power for making up delays, or for operating under adverse conditions. As a result, on the normal schedule they are often operated at considerably less than their full rated speed and power. The fuel consumption per horsepower-hour of a well-designed gas engine is at a minimum when operating at its rated speed and power. The fuel consumption does not change materially if the speed is reduced, but the power is maintained substantially in proportion to the reduced speed. In other words the engine is most efficient if operated wide open or thereabouts, regardless of speed. However, it is not desirable to load the engine to its full torque at speeds less than full speed, for maintenance reasons. It is equally undesirable to operate the engine at too low a load factor, as the fuel consumption is then extremely high. The best application is that which at any given engine speed loads the engine to the maximum torque which it can carry smoothly and without detonation or other unsatisfactory performance at that speed.

Fig. 3 indicates by percentage the horsepower and torque developed by a typical engine. The horsepower developed on test may be considered as 110 per cent of the rated horsepower. The engine should then be capable of continuous operation without damage or excessive maintenance at 100 per cent of the service rating and at 100 per cent speed. The governor should be capable of cutting off the engine at a speed slightly above its rate speed, illustrated in this case as 105 per cent of rated speed.

A series of tests have been run to determine the desirable loading when operating at reduced speeds. This is found to be a straight line extending from no horsepower at the idling speed of the engine to full service rating at 100 per cent speed. Any electrical control arrangement which causes the engine to be loaded materially above this line will give very good fuel economy, but to the detriment of engine life. If on the other hand, the electrical control scheme is such

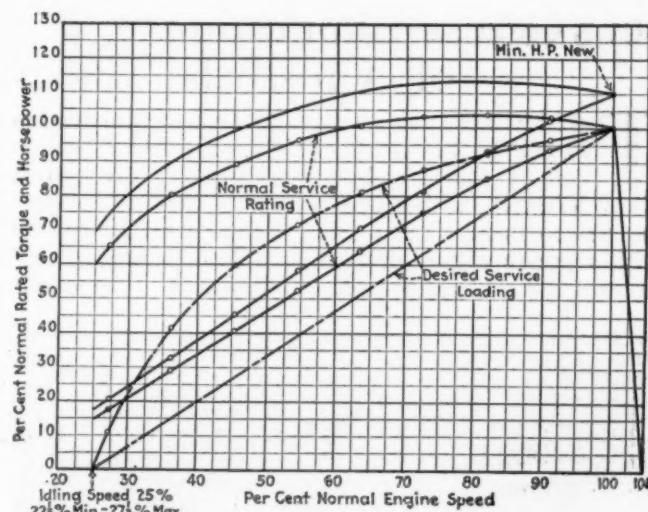


Fig. 3—The Curves Indicate by Percentage the Horsepower and Torque Developed by a Typical Engine

that the loading is materially less than the line shown, then the efficiency when operating at reduced engine speeds will suffer materially.

The ideal electric transmission system, therefore, from the standpoint of utilization, is that one which will utilize the full power of the engine within all car operating speeds, at the engine's rated speed, and which will give loading when operating at reduced engine speeds along the lower line of Fig. 3. Such an arrangement has been made and found entirely satisfactory. It also has numerous other incidental advantages.

Maintaining Air For Brakes

There are many conditions where it is necessary to maintain air pressure for braking purposes, where otherwise the engine would not be needed. With the typical differential control, it is necessary in such cases to disconnect the traction motors from the circuit and speed up the engine for the purpose of supplying five or six horsepower necessary to operate the air compressor. This obviously is objectionable from the standpoint of wear and tear, to say nothing of fuel economy, but the most serious objection is that the operator must willfully perform certain functions to insure an adequate supply of air for the safety of his train.

In view of the requirements as to battery charging and air-compressor operation, arrangements have been made whereby these functions can be handled from the main engine while idling. A number of such equipments are in service and represent a distinct improvement in respect to these accessories over previous practice.

The suggestion is offered that possibly a still better arrangement would be to supply a small auxiliary engine driving a small generator, to take care of these auxiliary requirements, in that way permitting of the handling of the auxiliaries as they should be handled, without disturbing the functions of the main power equipment. While this, of course, will add to the cost of the equipment, the results in safety, decreased complication of the main transmission, less wear and tear on the main engine, added assurance of an additional source of power for starting the engine, and numerous other incidental advantages, seem to justify this added expense.

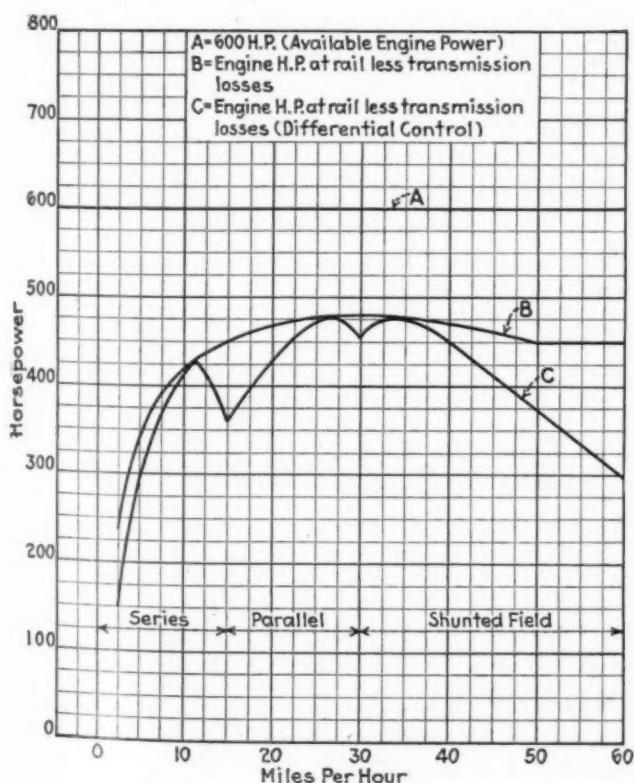
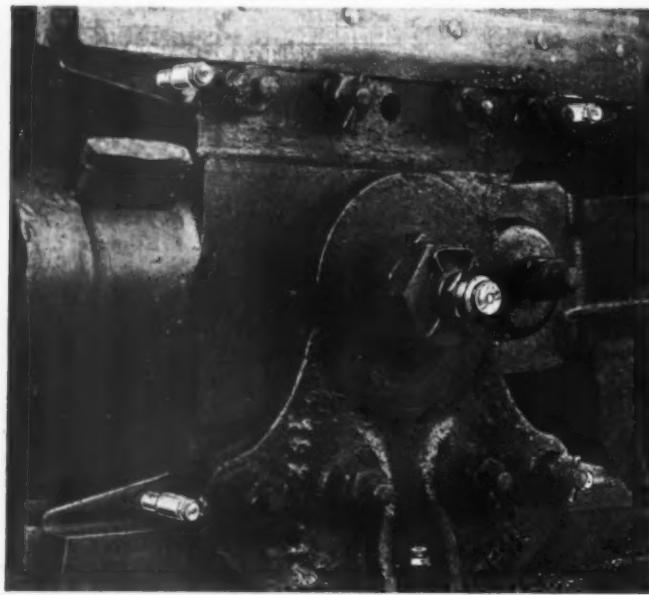


Fig. 2—Horsepower Output Compared with Speed

Soft Grease Lubrication of Crosshead Shoes

TESTS are now being conducted, notably in switching service on the Peoria & Pekin Union and in fast freight service on the Chicago & North Western, with a new method of lubricating locomotive crosshead shoes by means of soft grease applied with a pressure gun through suitable fittings to grease cavities and grooves provided in the shoes. The grease



Crosshead Equipped for Complete Pressure Lubrication

used is a special soft grease furnished by the Texas Oil Company, and the fittings are standard Alemite fittings made by the Alemite Manufacturing Corporation, Chicago.

Grease cavities are machined in the shoes, being closed by $\frac{1}{4}$ -in. plates welded in place and tapped for insertion of the pipe nipples and pressure gun fittings. Grease grooves, cut on the faces of the crosshead shoes, are connected with the grease cavities by one or more small holes as may be required. When the cavities and grooves are filled with grease, movement of the crosshead with respect to the guides, establishes a film of lubricant between the bearing surfaces, and as the movement continues it creates a partial vacuum which draws additional grease out of the cavities into the grooves. This vacuum and consequent drawing action is intermittent, lasting on each crosshead shoe only as long as it is in contact with the guide under pressure, as determined by the crank pin position.

Quite extensive tests of this method of lubricating crosshead shoes on switching locomotives of the Peoria & Pekin Union are said to demonstrate its advantages in providing adequate, positive lubrication, but without waste, as well as saving time. The cavities are quickly and easily filled with grease from a grease gun before the locomotive leaves the enginehouse, and no subsequent attention on the part of the engineman is ordinarily required. Experience indicates that a filling once in 10 days is sufficient.

This type of crosshead lubrication has also been tested for a number of months on the Chicago & North Western which has two locomotives, in time-freight service between Chicago and North Fond du Lac, equipped. The crosshead grease cavities are filled on

these locomotives on every round trip, or after a distance of 303 miles. Operation of the locomotives during the severe weather encountered last winter showed that good lubrication is consistently maintained and that the grease is not wiped off the guides by the action of the snow, or its lubricating qualities impaired by the low temperatures.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading amounted to 1,050,192 cars in the week ended May 4, an increase of 72,139 cars as compared with loading in the corresponding week of last year and an increase of 25,431 cars as compared with the corresponding total for 1927. Loading of all commodities, with the exception of grain and grain products, was larger than a year ago, although the greater part of the increase was due to the early seasonal movement of ore. As compared with loading in the corresponding week of 1927, only grain and grain products and livestock show a decrease. Loading in the Southern and Southwestern districts was smaller than a year ago. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading			
	Week Ended Saturday, May 4, 1929		
Districts	1929	1928	1927
Eastern	247,779	234,129	238,469
Alegheny	220,236	199,991	209,917
Pocahontas	55,691	54,382	61,877
Southern	147,223	148,519	154,263
Northwestern	159,252	124,679	155,148
Central Western	141,907	137,923	134,255
Southwestern	78,104	78,431	70,832
Total Western Districts	379,263	341,032	360,235
Total All Roads	1,050,192	978,053	1,024,761
Commodities			
Grain and Grain Products	38,744	43,701	40,575
Live Stock	28,255	28,224	29,501
Coal	158,889	154,359	156,502
Coke	12,197	10,308	10,826
Forest Products	68,779	65,571	68,745
Ore	66,512	16,090	56,763
Merchandise L.C.L.	265,338	263,837	264,908
Miscellaneous	411,478	395,963	396,941
May 4	1,050,192	978,053	1,024,761
April 27	1,051,728	963,007	1,021,576
April 20	1,004,156	945,289	950,545
April 13	971,730	912,659	949,561
April 6	956,364	919,352	953,907
Cumulative totals, 18 weeks	17,180,850	16,510,556	17,441,475

Car Loading in Canada

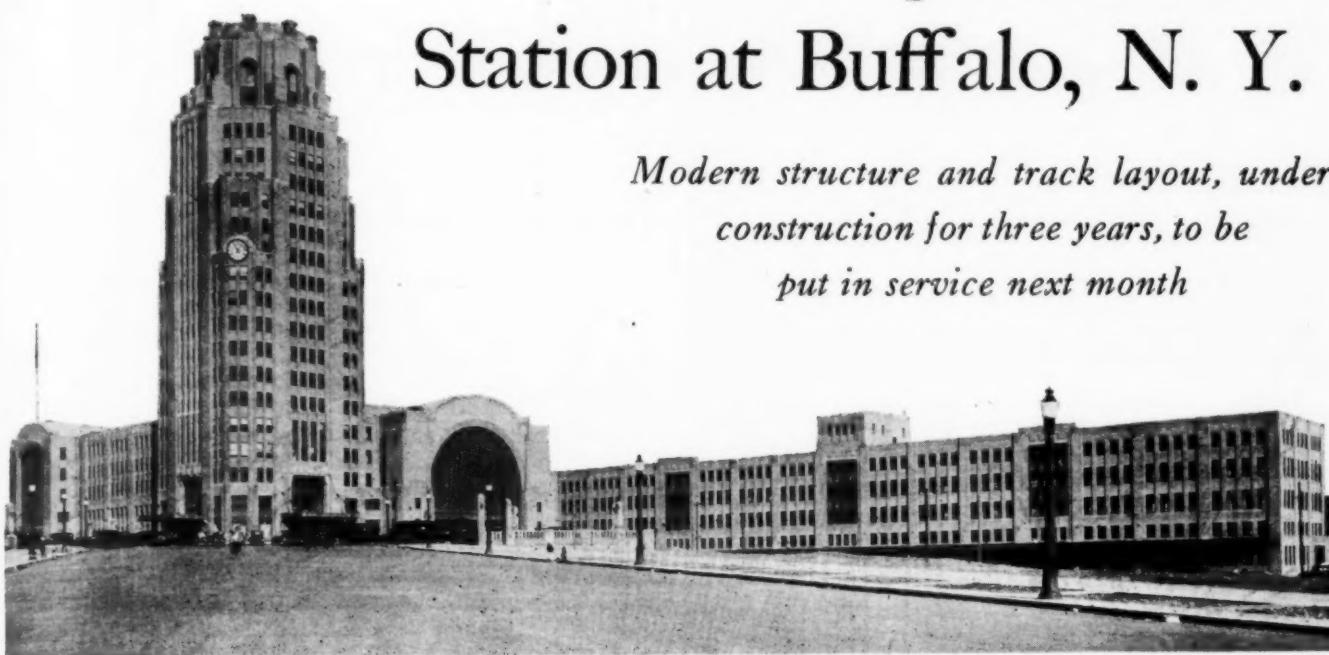
Revenue car loadings at stations in Canada for the week ended May 4 totalled 67,449 cars, a decrease from the previous week of 481 cars and an increase of 3,070 cars over the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
May 4, 1929	67,449	43,918
April 27, 1929	67,930	44,311
April 20, 1929	65,620	44,136
May 5, 1928	64,379	41,540
Cumulative Totals for Canada		
May 4, 1929	1,133,891	781,075
May 5, 1928	1,122,978	718,878
May 7, 1927	1,087,429	700,408

Canadian railways have received from their United States connections more traffic than they have delivered to them during the two months of the present year for which such information is now available. For the month of January 37.74 per cent of the traffic was received from foreign connections and 36.34 delivered to foreign connections. For the month of February 35.75 per cent was received from United States railways and 33.30 per cent delivered to them.

New York Central Completes New Station at Buffalo, N. Y.

Modern structure and track layout, under construction for three years, to be put in service next month



The New Passenger Station and Baggage, Mail and Express Building from the Main Approach

THE new station of the New York Central at Buffalo, N. Y., the preliminary plans for which were described in the *Railway Age* of October 30, 1926, is now practically completed and will be placed in service on June 23. To a large extent, the plans for this station, as outlined previously, have been followed. In the main they include, in addition to the new passenger station itself, the development of approximately 30 acres of land into an appropriate and attractive station site, the construction, widening and rearrangement of about two miles of streets, the construction of a large baggage and mail building, the further enlargement of the existing express transfer station, which for some time has been classed as the largest facility of its kind in the country, and the construction and alteration of about 65 miles of station and auxiliary tracks.

Other improvements in connection with the new station project include about 7,500 ft. of canopy-covered station platforms for the handling of passengers, baggage, mail and express, a coach yard of 11 tracks with intermediate low platforms and capacity for 100 cars, a coach repair shop, a Pullman supply building, a signal and interlocking system with two towers governing all movements in and about the station and a new terminal power plant. Altogether, these improvements have cost in the neighborhood of \$14,000,000.

Station Is Carefully Laid Out

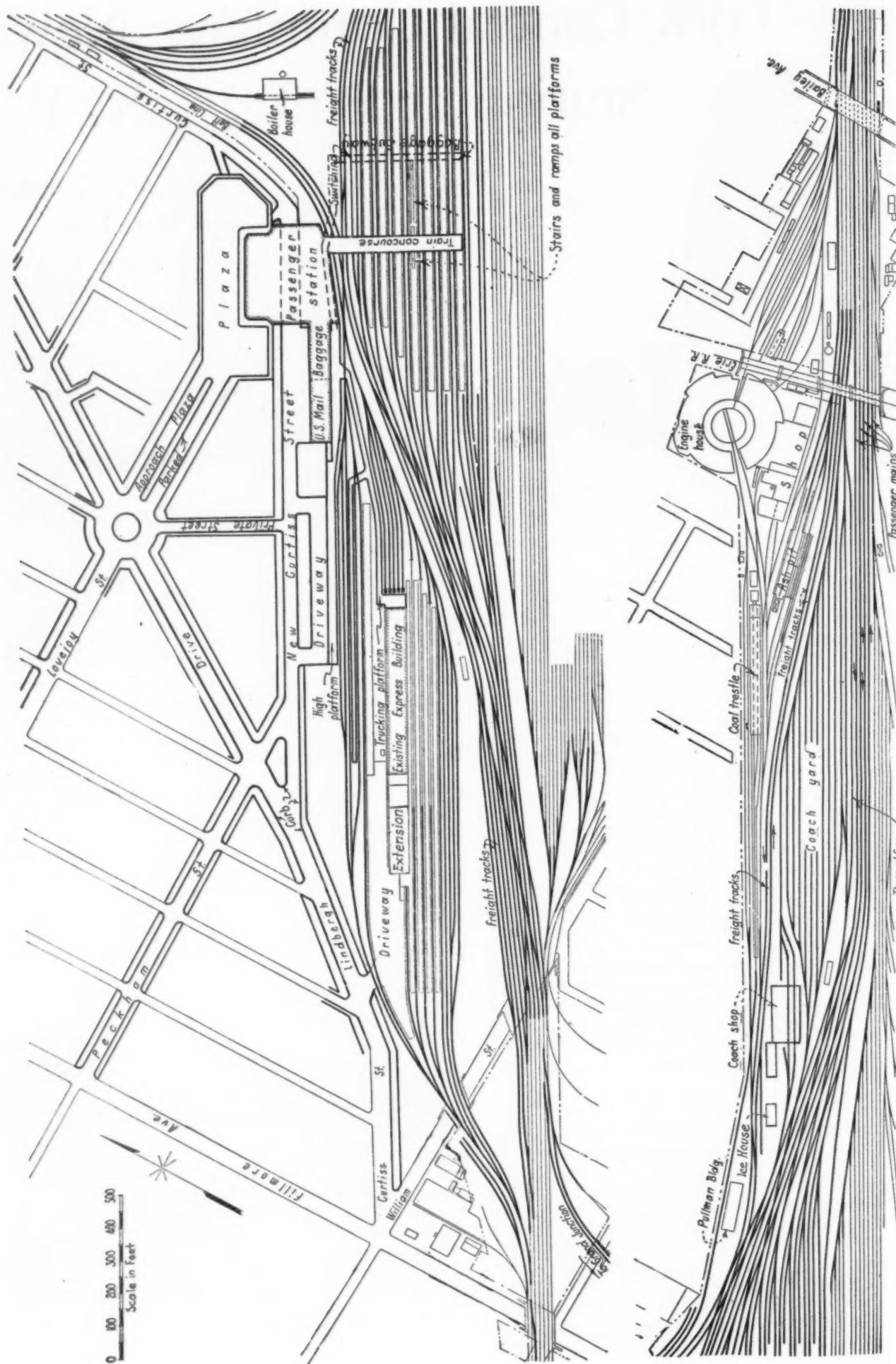
The new station replaces the obsolete facilities at Exchange street on the south side of the main business district, and is located on the east side of the city, about 2½ miles from the old station, but about the same distance from the business district as is the old station. The building, which is designed to handle 3,200 passengers an hour conveniently, is a steel-frame, brick-faced structure of pleasing architecture and design, with a 16-story tower, 80 ft. square, surmounting the main entrance lobby. The tower lies directly in line with a broad parked drive which, for about 650 ft., cuts diagonally across the station grounds on an ascending grade of 3.16 per cent maximum, forming the main approach to the station. At the top of this drive, which is at the main floor level of the station, the driveway broadens into a plaza of steel and reinforced concrete construction, 140 ft. in width, which extends across the full front of the building and for some distance around each side. The plaza, which will be used by all passenger vehicles arriving at the station, and for parking cars, has a total area of approximately 105,000 sq. ft.

In the general layout of the station building, which covers an area of about 94,000 sq. ft., the main floor is about 21 ft. above the track level, and contains all of the more important passenger facilities. Below the main floor, which is continuous throughout, are the track level floor and a mezzanine floor in addition to a basement, but the continuity of both of these floors is broken at about the midpoint of the building by an extension of a street directly under the station. This street, known as Curtiss street, was relocated and extended in con-



A View From the Tower Overlooking the East Half of the Station Tracks and Platforms

May 18, 1929



General Plan of the New Passenger Station Facilities at Buffalo

nection with the station project, and will be used as a thoroughfare for trucking supplies to the station, and for serving the large baggage and mail facilities which are located adjacent to it.

The upper floors across the front of the station building, of which there are three above the main floor, and 15 floors of the tower, are laid out for offices for practically all of the forces of the various departments of the road located at Buffalo. Other offices are also provided in the three upper floors of the four-story baggage and mail building, which joins the main station on the west side toward the rear and extends to the west along Curtiss street.

Large Passenger Facilities

In the entire layout, consideration was given to the comfort and convenience of passengers. As far as possible cross or opposing travel of incoming and outgoing passengers has been avoided, and the various facilities are arranged to afford passengers a minimum of travel in passing through the station.

The main entrance to the station is at the northwest corner of the building, directly beneath the tower, at which point doors on the north and west sides of the building lead into a large entrance lobby. This lobby, which will be used alike by passengers and by the forces occupying the office floors of the main building, is served by four elevators, two on each side. One of these elevators operates the full height of the tower, another to the fifteenth office floor and two to the sixth office floor only.

Immediately adjoining the entrance lobby is the large passenger concourse of the station, which extends the full length of the building and forms the main unit of the passenger facilities. This concourse, which lies in a general east and west direction, has a floor area 225 ft. long by 66 ft. wide, and an over-all area 294 ft. long, which includes the space over a balcony at each end. The ceiling proper over the concourse is of the vaulted type, with the highest point in the barrel 58½ ft. above the floor level, and domed sections are provided at each end which are 63½ ft. high.

Immediately to the right as one enters the concourse is the ticket office, with 18 windows, behind which is a large private working space for clerks, covered over by a balcony which extends across the west end of the concourse. The waiting room adjoins the south side of the concourse and is connected with it by a series of doorways. This room, which is about centrally located with respect to the concourse, is 108 ft. long by 59 ft. wide, and has a high flat-top arch ceiling.

Adjoining the waiting room are a rest room and lavatory facilities for women, and a small smoking room and lavatory facilities for men. The men's smoking room was made only 25 ft. long by an average of 20 ft. wide, to preclude loitering. A larger room was also thought inadvisable in view of the increasing number of women smokers, as a result of which there will be no restriction on smoking in the concourse.

On the north side of the concourse, practically the entire area under the office floors is given over to the restaurant and kitchen facilities, the principal exceptions being the entrance lobby on the west end, already referred to, and the exit lobby, which is located at the east end of the building. The restaurant, which is 100 ft. long by 56 ft. deep, has a relatively low ceiling, about 21 ft. high, and is divided into three main sections, according to the class of service given. The center section is given over to lunch room facilities, with a double



The Passenger Concourse Has Approximately 15,000 Sq. Ft. of Floor Space

U-shaped counter capable of accommodating 87 patrons at one time; the west end is the main dining room; while the east end is occupied by a coffee shop. These sections are separated from each other by ornamental metal screens of a height of about six feet. The kitchen facilities are located directly back of the restaurant along the front of the building.

The baggage checking room is located at the southwest corner of the concourse, directly adjacent to the ticket counters. This room, which is flanked across the front with a lobby, has approximately 1,900 sq. ft. of floor space and is connected with the main baggage floor beneath by means of a spiral chute for lowering parcels and luggage. Parcel checking facilities are provided at the east end of the concourse, conveniently near the train concourse, where there are located also such auxiliary facilities as a barber shop and telephone booths.

Large Train Concourse Is Provided

The train concourse extends from the south side of the passenger concourse for a distance of 480 ft. over all of the platform tracks of the station layout. This concourse, which is approximately 21 ft. above the track level, is 48 ft. wide and entirely enclosed. Train gates are provided along both sides directly above the track platforms, but all gates leading from the concourse to the track platforms are located along the west wall. Connections between the exit gates and the platforms is by means of enclosed stairways. At each exit gate is an individual bulletin board of the segmental type, which announces the time and destination of the trains; also, individual signal or annunciator boards, connected to the signal towers and platforms, which show the gatemen, trainmen and platform men when the trains are ready to depart.

Approach to the train concourse from the track platforms is provided on the east wall, opposite the exit gates, by means of both enclosed stairways and ramps. Through this arrangement it is planned to segregate incoming and outgoing passengers completely. All of the ramps are on a 10 per cent grade and 220 ft. long.

The main exit of the station is through a large lobby at the east front corner of the main concourse, which directs passengers leaving the station away from the lanes of travel of incoming passengers. This lobby opens out on the plaza where passengers can board private automobiles or taxicabs. Stairs from this lobby lead down to the ground level floor where a small waiting room and exit lobby is provided for passengers.

awaiting buses and street cars which will load and unload under the east end of the station plaza.

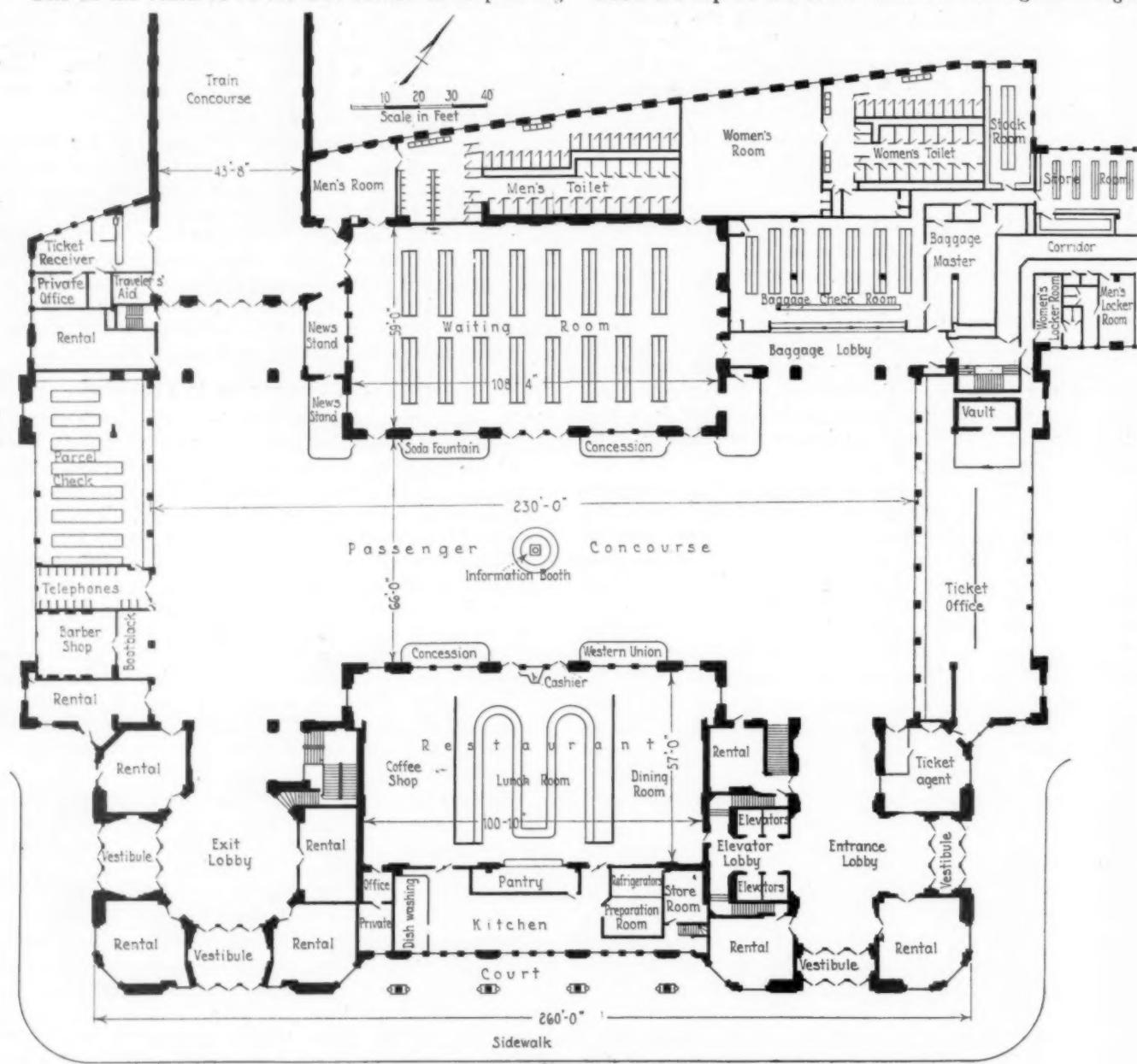
The basement, which extends under only a portion of the building, is occupied for the most part by store-rooms of the commissary department, and by the special machinery and equipment of the heating and ventilating systems. The front and rear sections of the track or street level floor are occupied principally by storage rooms, rental areas, the refrigeration equipment of the commissary department, a battery charging room, and a portion of the baggage room extending from the baggage and mail building. The lower mezzanine floor of both the front and rear sections of the building is laid out principally in locker, dormitory and lavatory facilities for train crews, porters and station attendants, and in rental and storage areas, a laundry and a bakery.

Beneath the plaza, with the exception of the space reserved for a bus and a trolley terminal, practically the entire area at the track level is laid out as a garage, which will be used for the equipment of the express company and others.

One of the features of the new station is its pleasing

appearance, both exterior and interior. The first step in this direction was accomplished through the construction of the plaza level at an elevation about 20 ft. above the natural ground level, and the provision of the wide parked approach driveway leading up to the main entrance. This is the more effective because of the pleasing architecture of the station itself, and the exterior finish which is of buff-colored rough-faced brick, ornamented and trimmed with Bedford limestone.

From the approach drive, one is impressed by the balance which has been worked into the general building plan, and in particular, by the tower with its broken lines and set-backs. Other features which add to the appearance of the building include the plaza with its ornamental stone balustrade and special lighting fixtures, the ornamental canopies which extend over both the entrances and exits, and the four large clocks, illuminated at night, which are located at the tenth floor of the tower. Still another feature of the station is an arrangement of floodlights grouped on the various set-backs of the tower above the tenth floor, which flood the top of the tower with colored lights at night.



Plan Showing the General Arrangement of the Passenger Facilities on the Main Floor

Interior Decoration Is Restful and Attractive

Within the building, as with the exterior, many details of architectural design and decoration have been employed to present a pleasing and harmonious effect, and obvious care has been taken throughout to use structural and ornamental materials which can be readily kept clean and in a sanitary condition. The materials used most extensively within the interior include Guastavino buff acoustic tile, light and dark Botticino marble, black and gold marble, black and white Carrara glass, and ornamental iron work with a silver and bronze finish.

In the passenger concourse, the train concourse, and in the entrance and exit lobbies, the vaulted ceilings are all faced with buff-colored Guastavino tile in various shades and tints, and in each case the tile work extends down to a continuous 12-ft. wainscoting of light and dark Botticino marble, extending around all side walls. One of the most interesting features of the building construction was in connection with the placing of the arched and domed roof and the tilework over the passenger concourse.

The floors throughout practically all the public areas are of colorful terrazzo tile with dark borders and sectional strips, and numerous designs break up and ornament the large floor spaces. The ticket and concession counters and the circular information counter in the center of the concourse have Botticino marble fronts and tops, surmounted by bronze-finished frames and overhead copings. In addition, the ticket counter is entirely enclosed with glass, with the exception of bronze grillages which form the 18 ticket windows. The lighting fixtures in the main concourse consist of bronze pedestals with frosted globes mounted on marble corbels around the sides of the room, a number of ceiling lights, and two ornamental chandeliers suspended from the vaulted ceiling.

Decoration in Waiting Room and Restaurant

In the waiting room there is a complete change from the mellow tones of the tile and marble in the concourses, and here the ceiling is finished in the Spanish antique and painted a sky blue with a prominent cloud effect. At each end of the room, the plainness of the vertical wall is broken by a large marble-faced clock, flanked on each side by a six-foot plaster plaque done in relief. A large train bulletin board is located centrally on the south wall; back-to-back oak settees are provided for waiting passengers; and as in the case of the main concourse, a 12-ft. wainscoting of dark Botticino marble extends around the room on all sides.

The restaurant is finished throughout in modernistic design and constitutes a maze of brilliant red, green and gold, brought together in an artistic assembly of geometrical designs. Adding to the unusual character of this room are the irregularities provided in the ceiling in the form of heavy beams and recesses, the indirect lighting which floods the walls and the ceiling, and the black and gold marble wainscoting, 4½ ft. high, which surrounds the side walls. The ornamental iron screens which separate the three sections of the restaurant are finished in silver and bronze, and the counter in the lunch room area has a skirt of Botticino marble and a top of black Carrara glass.

Carrying these features of interior finish and decoration throughout the other parts of the building used by the public, both the men's and women's toilet rooms are finished throughout with white Carrara glass, this being used for all of the toilet partitions and as a high

wainscoting around the walls. The floors of both rooms are of black and white hexagonal floor tiles; the individual toilet areas are closed off by mahogany doors; and one-half of the individual toilet areas are fitted with wash basins and mirrors. Access to the toilets in each room is gained through coin turnstiles.

Track Layout Speeds Switching

The track layout in connection with the new station involved the altering of approximately 30 miles of tracks, the construction of about 31 miles of additional tracks, and the installation of 40 slip switches and 180 turnouts. There are 14 main station tracks in the present arrangement, served by 7 intermediate platforms, although ultimate plans allow for 10 additional station tracks.

All of the station track platforms are of the low-level reinforced concrete type, 22 ft. wide and from 850 to 1200 ft. in length. They are covered with steel frame sheds provided with concrete slab roofs which drain towards the center columns. These platforms serve for passengers, mail, baggage and express, exit for trucks being provided by means of a 7 per cent descending ramp at each platform, which is located directly beneath the passenger ramp from the train concourse. All of the baggage ramps connect below the track level in a long subway passage which is continued at the north end in a ramp terminating at the track level near the east end of the baggage and mail building. The full length of the baggage subway is about 660 ft. All of the trucking to and from the station platforms will be done by electric storage battery trucks.

All of the station tracks within the limits of the platforms, or approximately 15,000 ft. of track, are carried on heavy reinforced concrete slabs, 18 in. thick at the edges and 14 in. at the center, which are provided with catch basins to permit ready drainage and cleaning. The track structure itself consists of 127-lb. rails spiked to short creosoted timber blocks which are imbedded in the concrete.

In order to expedite the changing of locomotives and switching movements, the station tracks have been connected in pairs at both ends so that switching on any of the tracks will result in minimum interference to movements on other tracks. Between the more southerly platform tracks, short tracks, stubbed at the ends of the platforms, have been provided for the purpose of holding power, coaches, diners, sleeping cars or other equipment to be added to or set out of trains. In addition live engine storage tracks are provided at both the east and west ends of the station and between the station and the most northerly platform track.

Other tracks immediately within the new station layout include two main through freight tracks, and two freight tracks of the west leg of the New York Central's inner belt line wye at East Buffalo, all of which lie between the station and the first platform track. All of these tracks are bridged by the train concourse, and thereby cause no interference to passengers.

Immediately west of the platform tracks, approximately 4½ miles of additional trackage has been provided for handling mail and express trains, and for connections and extensions to the tracks already serving the existing large express facilities, which have also been altered and extended considerably. Practically all of these tracks have through connections on both the east and west ends so that express and mail equipment can be moved in either direction in arriving or departing from the terminal.

In order to facilitate and speed up the movement of trains into and out of the new station, practically all of the switches, derails and movable-point frogs in the station track layout are controlled and operated through a new interlocking plant which has been installed. This plant includes two towers, one at each end of the station track layout; the towers being of brick construction to harmonize with the other station facilities, and lined on the interior with a $\frac{3}{4}$ -in. course of sound-absorbing material so as to reduce the noise in the operating rooms. These towers are in direct communication with each other, and with the nearest interlocking towers on the main line and belt line, by means of loud speakers.

The tower, or signal station, at the east end of the track layout includes 312 working levers, of which 173 are for signals, 29 for check locks and 110 for switches, derails and movable-point frogs. The tower at the other end of the track layout has 382 working levers, of which 222 are for signals, 29 for check locks, and 131 for switches, derails and movable-point frogs. All of the signals in the station layout are dwarf signals of the color-light type. The interlocking machines are of the latest type, as approved for use on the New York Central, with unit-lever assemblies, tappet slide-type circuit controllers, forced-down locks and lever lights. The interlocking system is the all-electric type furnished by the General Railway Signal Company, and was installed by the signal department forces of the New York Central.

The new coach yard is located about 2,000 ft. east of the station building and has 11 tracks with a total capacity for 100 cars. This yard has low Headley platforms between each pair of tracks, and, as in the case of the station platform tracks and hold tracks, is served by steam, air and water lines with outlets at convenient intervals. In addition, each coach yard track is served by charging outlets for use in connection with the charging of car storage batteries.

Under the present arrangement, all locomotives which start from or tie up at the station will be cared for at the two engine terminals already in the vicinity of the station. Plans are under consideration, however, for the combining of these facilities into one large engine terminal at a suggested location some distance east of the station.

Baggage and Mail Building Is Important Unit

Other important building units at the station include a baggage and mail building, a car repair shop and a Pullman service building. The baggage and mail building is a steel-frame brick-faced structure, harmonizing with the main station building, and extends to the west along Curtiss street, from the southwest corner of the station proper. This building, which is 362 ft. long by 60 ft. wide, has a track level floor, and three upper floors which are used primarily for offices.

On the lower floor, which is also at the street level, the east half of the building is given over for the handling of baggage, and the west half is for handling railway mail. Both sections are equipped on both sides with concrete trucking pavements, rolling steel doors and overhanging canopies, and in addition, have raised concrete platforms along the street side and the ends, at tailboard height. These platforms make it possible to move baggage and mail from the electric platform trucks into street trucks and vice versa, without the necessity of raising and lowering it to and from the floor level.

The upper floors of the building are to be used prin-

cipally by the car accountant forces, and all of these floors are finished with plastered walls and ceilings. One of the assigned areas in this building of special interest is the telegraph room. This room, which is an extension of the large telegraph room on the second mezzanine floor of the station proper, directly over the baggage checking room, is entirely lined with acoustic material to deaden noises from within and without. This same material has also been used in the telephone exchange and dispatcher's offices in the station proper.

Car Repair and Pullman Supply Facilities

The new car repair shop, which is equipped to handle all light repairs to equipment, is located at the west end of the coach yard. This shop is a two-story brick structure, consisting of two rectangular units, one approximately 165 ft. long by 78 ft. wide, and the other, adjoining it, about 102 ft. long by 29 ft. wide. The track level floor of the larger unit is suitably divided along the north side into separate areas for an air brake room, switch board, transformer, battery and generator rooms, toilets and a wheel delivery pit. The entire south half of this unit forms the main car repair area, and for this purpose, is served by two through tracks, both of which are fitted with inspection pits and drop tables.

The first floor of the smaller of the two sections of the shop, which extends from the northwest corner of the larger unit, is used as a car department storehouse. The second floor of the smaller unit is occupied primarily by car department offices, while the second floor of the main unit, which extends over only the north side of the building, is laid out principally in a large locker room, toilet rooms, and a carpenter and upholstery shop.

The new Pullman service building, which is located about 250 ft. west of the car shop along the north side of the leads to the station tracks, is likewise a two-story brick structure, and is 207 ft. long by 30 ft. wide. This building, which does not have a basement, is suitably arranged and equipped to meet all of the needs of the Pullman company at this point. In order to facilitate the handling of Pullman supplies to and from cars at the terminal, the Pullman building is served by a concrete trucking platform, about 1500 ft. long, which connects with all of the coach yard platforms on the east end and with a ramp leading to the baggage subway under the station tracks on the west end.

Heating of the entire new facilities at the station, including the station building itself, is by steam supplied by a new power house located about 300 ft. directly east of the passenger station. Throughout the office portions of the station and the baggage and mail building, heating is by direct steam to radiators located along the exterior walls. In the large public areas, however, heating is by the indirect method, warmed air being supplied by batteries of large capacity blowers located on the track level floor of the main station building. All piping to and from the power house is carried in underground ducts. While all of the new facilities at the terminal are of practically fireproof construction, the entire layout is protected by a fire alarm system.

With the opening of the new station, a part of the old Exchange street station will be employed temporarily as a downtown station, awaiting final plans for a new downtown station which is under consideration. It is estimated that this latter work, which will be undertaken, undoubtedly, in the near future, will involve an additional expenditure of about \$9,000,000.

Architects for the new station building were Alfred Fellheimer and Steward Wagner, New York City.

while plans for all other parts of the improvement were prepared by the engineering department of the railroad company. All of the engineering and construction work was carried out under the general direction of F. B. Freeman and J. W. Pfau, chief engineer and assistant chief engineer, respectively, of the New York Central (Buffalo and East), while direct supervision over the work has been in charge of W. F. Jordan, principal assistant engineer, who has been assisted by M. M. Manning and L. P. O'Keefe. The Walsh Construction Company, Davenport, Iowa, was the contractor on the station building; the structural steel was fabricated by the Bethlehem Steel Company, Bethlehem, Pa., and was erected by the Overland Construction Company, Chicago. All track work was done by railroad forces.

Northern Pacific Runs Typewriter Hospitals

AT three points along its 7,000 miles of line, St. Paul, Minn., Missoula, Mont., and Seattle, Wash., the Northern Pacific is now operating shops for the repair of its mechanical office equipment. Composing this equipment are 2,064 typewriters and 2,157 other devices, including adding and listing machines, bookkeeping and accounting machines, calculators, commercial numbering machines, ediphones and dictaphones, mimeographs, addressographs, pay-check writers, money changing devices, etc., and the investment approximates \$500,000. By means of these shops and the inspection work which they also do, the Northern Pacific has been able to keep its equipment in better condition at less expense than formerly. It cost the Northern Pacific \$13,000 in 1928 for servicing, maintaining and repairing 4,647 machines and it is the opinion of A. V. Fabian, superintendent of work, that this was only 60 per cent of what would have been expended if the centralization had not been effected.

Prior to the establishment of the repair shops, typewriter and other office machinery repairs for the general offices were made by communicating with the proper supply firm, which would send a repairman to the designated office, after which a bill for the service would be presented and held until the receipt of a purchasing agent's formal order for the service. The purchasing agent's order would only be issued upon a formal requisition from the department requesting the service and when this order was received by the supply firm, the bill would be rendered against the Northern Pacific and might go through several departments before it would be paid, although usually not exceeding \$1.25. When repairs were required at other points, local concerns were called upon to give the service and the orders were handled through similar channels.

Under the present arrangement, machine troubles are reported directly to the nearest repair shop on a form stating the nature of the trouble and whether a relief machine is required or not. If a relief machine is required, it is sent out from the shop and the out-of-repair machine is then brought to the shop for repairs. If the trouble is of a minor nature, the machine is repaired by traveling inspectors who are employed in sufficient number to inspect and service the office equipment at all division points three times a year and also at all stations using a large number of machines. Machines

at smaller stations are sent into the repair shops periodically for overhauling.

The shops have a card record of each machine on the system and on these cards is kept a consecutive record of the work done to each machine with the date of work, labor charges, material cost and the place to which it is assigned. This record is of value in determining the value of the machine; it also facilitates



In One of the Servicing Shops

economical purchasing of new equipment. Purchases in the past were made by the heads of different departments, often without knowing the actual necessity for replacement or additional equipment. Purchases are now made after an inspection of the old machines and a recommendation by the equipment repair shops. Under this method, the best machinery is placed where it is most needed and all new purchases are subject to suggestions of the repair forces based on experience with different kinds of equipment and the record of repair costs.

In addition to the saving in the cost of repairs and the greater economy with which new equipment may now be purchased, the operation of these shops has eliminated the time lost in waiting for repairmen, is extending the life of some office equipment from 4 to 5 years and is placing at the disposal of various departments a standardized knowledge of equipment and practice which was not available before.

* * *



Switching on the Ice with a Caterpillar Tractor
at Toledo, Ohio

A New Self-Locking Thread

THE Dardelet Threadlock Corporation, New York City, is introducing in this country a new type of self-locking thread, applicable to all classes of bolts, and adapted particularly where there is a tendency for nuts to loosen, owing to vibration or shock. It is said that this new thread, which was developed in France, locks the nut on the bolt at any point without deforming or injuring the thread, and that a nut can be re-applied repeatedly with the full locking strength.

The profile of the Dardelet thread, which is of the square type, has a slope at the root of the male thread which rises toward the point of the bolt, and a corresponding slope on the ridge of the female thread. This slope, which is at an angle of six degrees, is called the locking slope or angle. The threads are of such cross-sectional contour as to allow axial play between the nut and the bolt within fixed limits, and therefore, when not under load, the nut is finger-free. While in engagement, the opposed sloping faces of the thread are jammed against each other by a crosswise wedging movement, locking them together securely.

When the Dardelet nut is screwed on a Dardelet bolt, the nut is advanced along the bolt with the conical surfaces lightly in contact. When the nut seats, the conical surfaces are forced into closer contact and the material of the nut is stretched within its elastic limit until the approximately square abutment faces of the thread are in contact. The nut is then under stress, and is locked to the bolt by frictional adherence. If it is necessary to tighten the nut, it can be further rotated, while it retains its locking grip on the bolt.

In spite of the locking friction which must be overcome in tightening the nut, it is claimed that the effort required to bring a given pressure is actually less than that necessary to do the same work in the case of a standard V thread. This, it is said, is due to the fact that the friction set up by a 60-deg. V thread under a given load, is greater than the combined friction in the Dardelet thread assembly of the conical surfaces and the practically square abutment thread faces which take the load.

The most extensive application of the Dardelet thread in the railway field up to the present time has been in connection with track bolts, a large number of which,



Longitudinal Section Through a Dardelet Nut and Bolt

it is said, have been used with success on foreign roads. The manufacture and sale of bolts in this country, having the Dardelet thread, will be handled by licensees of the Dardelet Threadlock Corporation. At the present time, the Bethlehem Steel Company is manufacturing Dardelet bolts of the larger sizes for track work, and the Federal Screw Works the smaller bolts.

Accident Investigations,

Third Quarter, 1928*

THE Interstate Commerce Commission has issued its quarterly summary of train-accident investigations No. 37, covering the months of July, August and September, 1928. This bulletin contains the condensed reports of ten collisions and five derailments occurring within those three months; and also an abstract of one other report, No. 1404, on a derailment occurring at Watkins Glen, N. Y., in March, which was not published in the bulletin for that quarter. The Watkins report was issued in a special illustrated bulletin dated January 3, 1929. Another accident, that at Gowdley, Miss., on September 22, (No. 1444) the report of which is abstracted below, is not included in the present bulletin.

The reports of the Bureau of Safety on the other 15 accidents have been abstracted in the *Railway Age* during the past four months, as indicated by the dates in the following table:

1404. N. Y. Cent.	Watkins Glen, N. Y.	Mar 11	D
1428. So. Pac.	Bayshore, Calif.	July 4	* Dec. 15. D
1429. L. & N.	Curtis, Ga.	July 8	Dec. 15. C
1430. Grand Tr. West.	Flushing, Mich.	July 8	Dec. 15. D
1432. Wabash Railway	Mineola, Iowa	July 20	Dec. 15. D
1433. Boston & Me.	Farmington, N. H.	July 22	Dec. 15. D
1434. Balt. & Ohio	Martinsburg, W. Va.	July 25	Dec. 15. C
1435. Southern Pac.	Cortena, Calif.	July 29	Dec. 15. C
1436. Wabash Railway	Valley City, Ill.	Aug. 3	Dec. 22. C
1437. Ill. Central	Mounds, Ill.	Aug. 6	Nov. 10. D
1438. Piedmont & No.	Buncombe, S. C.	Aug. 11	Dec. 22. C
1439. Mo. Pac.	Waring, Kans.	Aug. 20	Dec. 22. C
1440. C., St. P., M. & O.	Stillwater Jet., Minn.	Aug. 23	Dec. 22. C
1441. Hocking Valley	Cummings, Ohio	Aug. 26	Dec. 22. C
1442. Texas & Pac.	Cheneyville, La.	Sept. 1	Mar. 9. C
1443. New York Central	Mott Haven Jet., N. Y.	Sept. 4	Mar. 9. C
1444. Yazoo & M. V.	Gowdley, Miss.	Sept. 22	D

* The second column of dates shows the issue of the *Railway Age* in which the abstract appeared.

New York Central, Watkins Glen, N. Y., March 11.—A northbound freight train, moving at about 20 miles an hour, was derailed by the breaking of the lower arch bar of a truck of a coal car of 55 tons' capacity; two brakemen killed, one injured. A study and investigation made by the engineer-physicist of the commission showed that the arch bars (including one on another car) had failed at their edges, at the upper sides, adjacent to the seats of the column castings. The location of the fracture is ascribed to the effects of concentrated stresses and vibratory action received by the truck frames while in service.

Yazoo & Mississippi Valley, Gowdley, Miss., September 22, 4:10 a.m.—A northbound passenger train moving at about 25 miles an hour was derailed at a broken rail and the locomotive was overturned. The pilot engineman and the fireman were killed and three employees were injured. The rail that broke was rolled in 1889 and weighed 75 lb. per yard; but in 1908 it was re-rolled and then weighed about 70 lb. per yard. It showed little wear. The fracture was 4 in. from the receiving end and extended diagonally downward from the ball through the web, and the broken piece was partly held in place by a Weber joint. A small piece of the upper part of the rail was missing.

* The government investigations for the second quarter of 1928 were abstracted in the *Railway Age* of November 10, page 937, and those for the first quarter in the issue of September 22, page 554.



Cedar Hill Yard Is the Hub of the New Haven's Terminal Plan

New Haven Consolidates Its Terminals

Yard design and operation improved by an extended and careful study

AS a result of changes in terminal operation, made after extensive study, the New York, New Haven & Hartford has closed six yards entirely, and has confined operations to local industrial switching at a dozen or more other yards that were formerly used extensively for through traffic. The results were clearly indicated in 1928, when 35 per cent more business (as measured by gross ton miles) was handled than in 1920 with 24 per cent fewer freight yard engine hours.

Gravity classification yards, equipped in some cases with retarders, are now being used almost exclusively on the New Haven, as a result of this study. The facts developed indicated that, on the New Haven at least, gravity switching is much more economical than flat switching, and, that in addition, it is possible to operate hump yards economically and efficiently at places where the number of cars handled is relatively low.

The concentration of classification work at a limited number of yards has resulted in a marked reduction in the cost per car handled, and the use of gravity, supplemented by car retarders in some instances, has increased this reduction. Much of the saving made is, of course, somewhat intangible, but operating statistics and the annual report reflect materially improved terminal operation from the standpoints of both cost and service.

The terminal study has pursued three principal trends, as follows:

At what points on the railroad should cars be yarded?
What methods should be pursued in yarding the cars?
What design of yard is most efficient?

The New Haven serves a highly industrialized section of the country. Of its total traffic, approximately 95

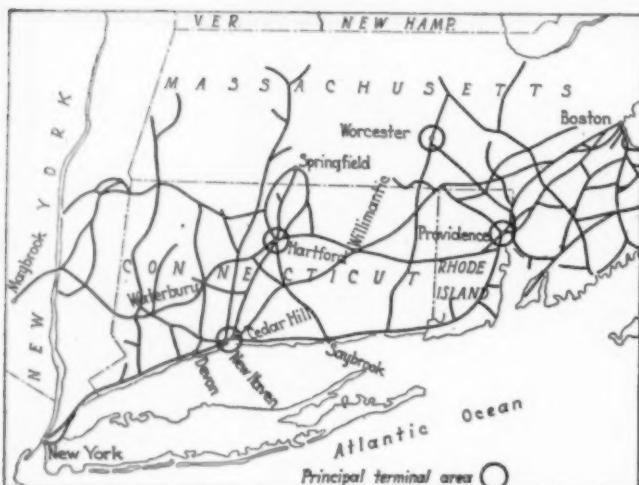
per cent originates at or is destined to some 550 different points on its lines. Its lines radiate in many directions from its various terminals and many special problems are encountered that are not duplicated in other sections of the country. Nevertheless, much of the material developed is applicable to railway terminals anywhere.

Centralizing Operations

When the study began, the New Haven had one and sometimes two separate yards at practically every junction point, which meant that there was a yard every 40 or 50 miles. It also meant that trains moved over the railroad only 40 or 50 miles at a time, with intervals for yarding between.

This was by no means unusual on other railways at that time. On the New Haven, however, the situation was aggravated by the fact that the system was the result of consolidations, at various periods, of an unusually large number of short lines, so that duplicate facilities were in existence in many places.

The first step was to consolidate the classification at strategic points to do away with the uneconomical switching at intermediate yards. The flow of traffic was considered carefully both as to volume and as to points of origin and destination. Based on the results of this survey which was taken for a considerable period to insure its accuracy despite seasonal fluctuation, it was determined to establish the four principal terminals at New Haven, Conn., Providence, R. I., Hartford, Conn., and Worcester, Mass. As may be seen from the accompanying map, New Haven, Providence, and Hartford are each the center of from six to nine converging



The Network of Lines Rendered the Terminal Solution Difficult

routes, while Worcester is in the heart of a highly productive manufacturing district with, in addition, important interchanges with several connecting lines.

The New Haven Terminal

The selection of Cedar Hill (New Haven) as the principal terminal for the first classification of business received from the western lines and the final classification of cars to be delivered to those lines, rather than some point in the New York terminal zone, was based on the fact that all yards in the New York zone were already being used to the limit of their capacity. Any expansion of these yards would have been so expensive, because of the congested areas in which they are situated, as to be entirely impracticable. In addition it was desired to provide a terminal which would permit the consolidation of traffic received from both western gateways, New York and Maybrook, which automatically placed the terminal east of Devon, Conn., where the Maybrook route joins the Shore Line. As a matter of fact, if the terminal at Cedar Hill, just east of New Haven, had not been built, it would have been physically impossible to have handled the present business through the New York terminal. As an indication of what the Cedar Hill terminal has done in relieving the congestion in the New York zone, the classifications at Oak Point yard, in the Bronx, have been reduced from 18 to 2, so far as traffic for Cedar Hill and east is concerned.

Cedar Hill also serves as the initial eastbound and final westbound classification point for business moving via Maybrook, N. Y., where interchange is effected with the Erie, the Lehigh & Hudson, the Lehigh & New England, the New York, Ontario & Western, and, via Camp-

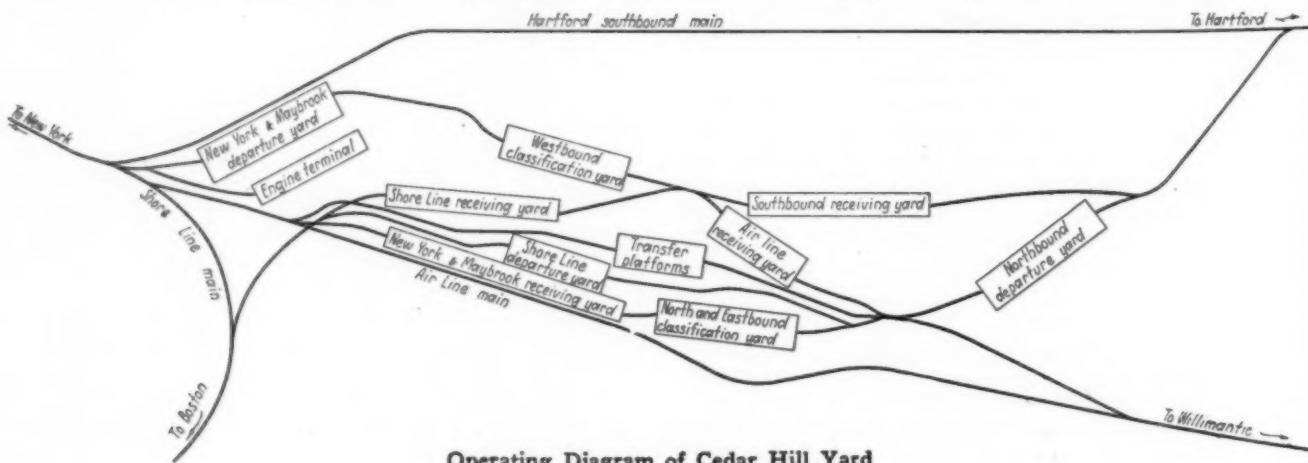
bell Hall, with the New York Central. There is plenty of room for expansion at Maybrook but the traffic moving through this gateway is so diversified in its character and spreads over such a wide area, that it would not be possible to segregate it into solid trains, or even solid blocks for movement through to destination, and operate on anything like a full tonnage basis, unless the cars were to be delayed, awaiting sufficient tonnage. Accordingly, on the eastbound movement particularly, most of the traffic goes through Maybrook to Cedar Hill, where it is classified and consolidated with cars for the same destinations which come into Cedar Hill, via the New York gateway. This consolidation permits the running of solid trains from Cedar Hill to 14 separate destinations daily, with full tonnage, and also facilitates the efficient make-up of trains containing blocks of cars for several destinations. At both the New York and Maybrook gateways, a few trains of perishables and high grade freight are made up daily, moving directly to such destinations as Boston and Providence, without yarding at Cedar Hill.

When Cedar Hill was decided upon as the proper location for the major classification point, numerous difficulties arose as to the proper design. In its final form, Cedar Hill contains four receiving yards, two classification yards and three departure yards, as indicated in the accompanying layout. Straight-line operation was impossible in all cases by reason of the divergence of entrances and exits, but the successful operation of this yard demonstrates that this feature, while desirable, is by no means essential. A heavy volume of traffic is being handled from the Shore Line receiving yard over the hump successfully, with the receiving yard paralleling the classification yard, while the heavy eastbound movement is being pulled out of the classification tracks successfully and then set up in trains in the eastbound departure yard, which adjoins the receiving and classification clusters, requiring a reverse movement.

These details are almost directly at variance with the ideas held for a number of years, and the successful operation of the yard tends to discredit the theories previously held as to the requirement that receiving, classification and departure yards must necessarily be situated in tandem.

In October, 1928, a total of 117,146 cars were humped at Cedar Hill, 54,528 eastbound and 62,618 westbound, an average of 3,778 cars daily, while 9,131 cars were handled during the same period at the freight transfer situated within the yards.

Cedar Hill is manned by car-riders, but both humps are to be equipped with car retarders this year. Certain questions as to operating design have also entered into this change. At present, the eastbound classifi-



Operating Diagram of Cedar Hill Yard

cation yard is on a 0.35 per cent grade. In view of the fact that 80 to 85 per cent of the cars humped are loaded, the study indicates that a grade of 0.25 per cent may be sufficient under retarder operation, but, in the beginning, the body of the yard will be retained on the 0.35 per cent grade and the head end of the yard, where the grades will be changed, will be lowered to 0.25 per cent, below the retarders. In the westbound yard, the present 0.3 per cent grade will be continued, as loaded and empty cars are about equally divided there. The upper ends of the classification tracks will be regrouped and connected to widely diverging leads, to eliminate the long ladders necessary under manual operation. The tracks will be arranged in groups of five below the last retarders.

The scales will also be removed from the two humps, which will permit the humps to be lowered several feet. The relatively few cars to be weighed will be handled elsewhere in the yard, thus increasing the flexibility of hump operation.

Hartford Terminal

While Hartford, Conn., is now a local point on the New Haven, until the Central New England was taken over, and for some time thereafter, three yards were maintained in this terminal, one on the New Haven proper, and two on the C. N. E., one at Hartford and the other at East Hartford, a few miles away on the opposite side of the Connecticut river.

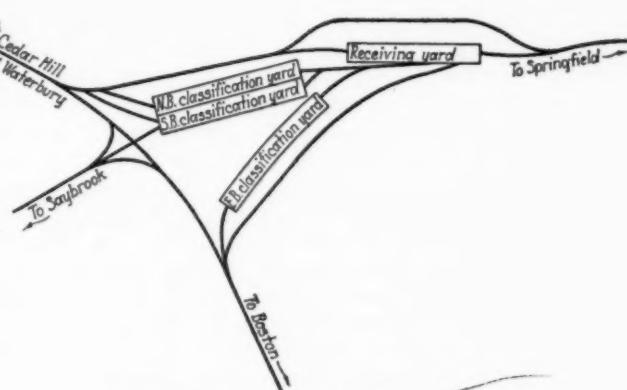
The terminal study developed an urgent need for some better arrangement at Hartford. The line between Springfield, Mass., and New Haven, 62 miles, serves a highly developed manufacturing district. Not including New Haven, there are 518 industrial sidings on this line, many of them serving several industries. In addition to being the central point on this line, an important east-west line also passes through Hartford, and several branch lines of considerable importance terminate there.

The operation of the terminal, with two yards some distance apart, was a cumbersome process. The numerous way-freights entering Hartford from various directions bring in a large number of cars daily. The capacity was limited and congestion was formerly expected each winter. It was necessary to perform a great deal of switching at Springfield to relieve Hartford, which was expensive, since the facilities at Springfield were sufficient only for serving the local industries.

Hartford did not then and does not now serve as a central classification point such as Cedar Hill, for example, but it was and is an important cut-out and fill-in point for both the north-south and east-west through traffic, in addition to the large business originating in and destined to the vicinity.

When these facts were brought out by the study, it was decided to replace the three flat yards with a single gravity yard. This was built as a retarder yard although it was operated temporarily by car riders. Some interesting comparisons were made as to the relative efficiency of the two forms of gravity switching, the details of which may be found in an article entitled "The Economies of Car Retarders," which appeared in the *Railway Age* of November 3, 1928, page 871.

One of the controlling features that led to the installation of retarders, was the service requirement. Some 1,000 cars per day are classified at Hartford, and, conceivably, a sufficient number of riders might have been put on to handle all of these in one shift. This operation, however, would not have met the service requirements and the daily delay of 16 hours would have meant that many important connections would be missed. With retarders, the yard is operated on a three-



Operating Diagram of Hartford Yard

trick basis, thus fulfilling all the demands of the shippers, without increasing operating expenses unduly.

Several unusual features of design entered into the planning of this yard. The map shows the diverging lines entering Hartford. The plan of the yard itself shows how the problems of diverging traffic were met. It also indicates how through traffic not classified at Hartford passes the yard with the minimum of interference to local operations. Trains from the main lines and the various branches south and east of Hartford all enter the yard area from the south. If a through train is proceeding eastward in the direction of Willimantic and Boston, it leaves the main line just south of the yard, as indicated, while if it is proceeding to Springfield, the main line on the west side of the yard is used, entirely apart from the yard operations. Movements in the reverse direction are handled similarly.

Trains that are to be classified at Hartford present a different problem. If they are from the main lines and branches south, southwest, and west of Hartford, they enter the yard area from the south and run past the classification yard into the south end of the receiving yard. A series of conveniently-arranged cross-overs facilitates this movement materially. Trains from the north proceed directly into the north end of the receiving yard, while trains from the east pass alongside the special yard of six tracks comprising the eastbound section of the classification yard, and thence into the eastern half of the south end of the receiving yard. Trains from the Saybrook line approach from the southeast, then run around a loop to reach the northbound main line, being taken thence into the receiving yard.

Upon arrival in the receiving yard, the trains are humped into the classification yard, which is divided into two sections as shown. The principal section, consisting of 24 tracks, is used for south and westbound cars, which use the eastern half of the main section and for northbound cars, using the western half. The supplementary section of the yard is reached by leads which leave the leads to the main section shortly below the apex of the hump. Although this classification yard is situated at an angle with the other classification cluster, the curvature of the leads is so arranged that retarder operation may be conducted without difficulty. That this ingenious solution to an unusually difficult problem is working out successfully is indicated by the comparative figures given in the article referred to previously.

Providence is the largest city in the country served by only one railway. According to the 1928 estimated census, this city had a population of 280,600, and the territory within a 12-mile radius brings the total well over half a million. Providence is an important port,

the seat of numerous oil refineries, textile mills and many other industries. On the Providence division, 297 miles, there are 543 industrial sidings. To serve this territory, the Providence terminal was established, consisting of 39 miles of tracks and a gravity classification yard. This yard consists of a receiving yard, with 8 tracks, holding from 62 to 97 cars each, having a total capacity of 614 cars, and two classification yards, situated side by side and served by the same hump. The westbound classification yard has 13 tracks, holding 47 to 61 cars, with a total capacity of 715 cars; the eastbound classification yard has 15 tracks, holding from 23 to 50 cars with a total capacity of 520 cars.

The gravity terminal at Providence is situated at the hub of nine radiating and converging routes, with the receiving and classification clusters in tandem. The westbound movement is straight-away, the departing trains being made up in the classification yard. In the opposite direction, the trains pull into the humping end of the receiving yard over a low-grade track, and, after being classified, departing cars are set over from the classification tracks to parallel tracks. The location of the yard at the hub of operations provides that every car over the hump, from whatever direction or whatever train or transfer it comes, is properly grouped.

In handling the entire traffic of this large city and its surroundings, supporting yards are situated at strategic locations throughout the large territory comprising the terminal. Cars are brought into these supporting yards from the various industries, and these together with both team track and freight house cars are assembled, following which transfer runs are made from the supporting yards to the central gravity yard.

The central yard is at present manually operated, but will be changed into a retarder yard this year. An average of about 1,000 cars per day are humped. As an indication of the performance on a typical day, when a *Railway Age* representative visited this yard, in one eight-hour trick, 316 cars, with a total of 255 cuts, were humped, using 4 riders, making an average of 63 rides per car rider.

The situation at Worcester was much the same as at Providence, except that the business originating locally is lighter. To offset this, however, a number of important interchanges are made at Worcester. The space available was limited by the industrial and residential districts and by the various branches of the Blackstone river. By the building of a single receiving hump and classification yard at a strategic central point, however, trains and transfers from any of the several directions can easily and directly reach the hump and, with similar facility, cars can be made up in trains after they have been classified.

General Conclusions

As a result of study, followed by actual experience in operation, certain general conclusions were arrived at in regard to terminal operation. In the matter of gravity switching and yard design, these conclusions were summarized by E. J. Pearson, late president of the New Haven, as follows:

"The earlier and quite largely the present general conception of gravity switching is in connection with the thought of handling such a large volume of traffic that facilities for eastbound and westbound operations are required, consisting of receiving clusters, classification clusters and departure clusters.

"In present-day operation, the cars are so heavy, the necessity for prompt handling is so pressing, and the classifications to be made at principal points are so many, in order to secure the best possible number of

'maintrackers' or pre-classification, so that the cars will get the best movement thereafter, that the old-fashioned method of switching by the tail is too slow and inefficient. In fact, in many cases flat switching is impossible, if all that should be done is done.

"Whether the volume to be switched is more or less, favorable grades in the direction of the traffic always facilitate the operation. In some cases, it has been stated that the volume of traffic handled through one yard was not sufficient to justify gravity operation, but if the facts are analyzed and more definitely determined, it will be found usually that the design of the gravity terminal was not adapted to the volume to be handled.

"At various points on the New Haven and elsewhere, the advantages of gravity are being secured with only one hump over which all traffic is handled, eastbound, westbound, northbound, southbound, and to added advantage when there are one or more additional radiating lines converging at the terminal. Under circumstances in which all of the traffic is sufficient to justify a single gravity operation, this means generally that only a few additional tracks in the classification cluster are essential, as, from whatever direction or via whatever route the cars are received in such a terminal, many of the classifications are common, such as for the house, for the bulk yard, to be held, for reconsignments, bad orders, for certain industrial switching districts.

"Such a terminal also has the advantage that one hump organization covers everything. Moreover, from wherever the train or transfer job is received, every car may almost immediately be put over the hump into its proper classification for its next forward movement everywhere and anywhere."

Single Unit Operation

The study also developed that, in determining the practicability of a single-unit gravity operation, as against a two-unit operation, the following factors must be taken into consideration:

The number of classifications required

The volume of traffic

The number of cars which, with two-unit operation, would have to be moved from one yard to the other.

The peak traffic.

The time available for handling it.

The capacity of the road for handling outbound trains.

In many terminals having a yard for each direction, a considerable portion of the cars that naturally arrive in one yard must depart from the other, and vice versa. By concentrating the terminal into a single unit, this rehandling is eliminated, resulting in less cost and less delay to traffic. Where there is much of this class of traffic, every possible effort should be made to handle the business in one unit. Under actual conditions, it was found that the limiting factor of single-unit operation, so far as volume of traffic is concerned, is a peak traffic of approximately three thousand cars and a daily average of about twenty-five hundred cars, providing there is space and money available for an efficient single-hump operation.

The importance of evolving a system terminal plan, rather than attempting to solve each terminal problem only with regard to local conditions, is clearly indicated by the study. This may be briefly summarized as follows:

A yard should be located and designed for the expeditious handling of trains and cars, not only within its own limits, but for the system as a whole. This means that cars must not only be switched promptly upon arrival at a terminal, but must also be switched into groups for final distribution.

Rock Island Uses Novel System for Operation by Signal Indication

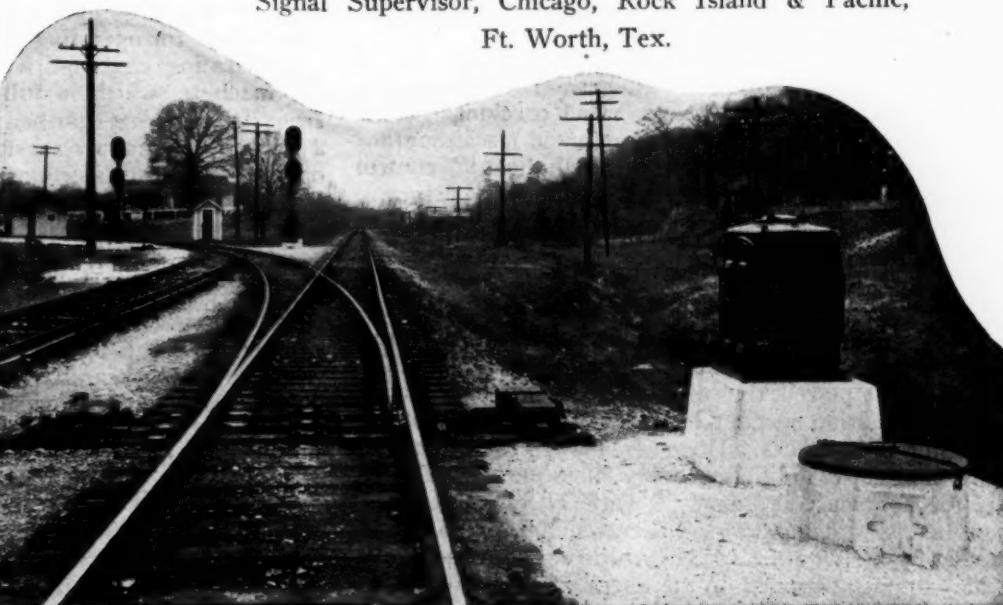
Two remote-power switches, a spring switch and a yard track indicator expedite trains at Hot Springs Junction

By B. F. Beasley

Signal Supervisor, Chicago, Rock Island & Pacific,
Ft. Worth, Tex.



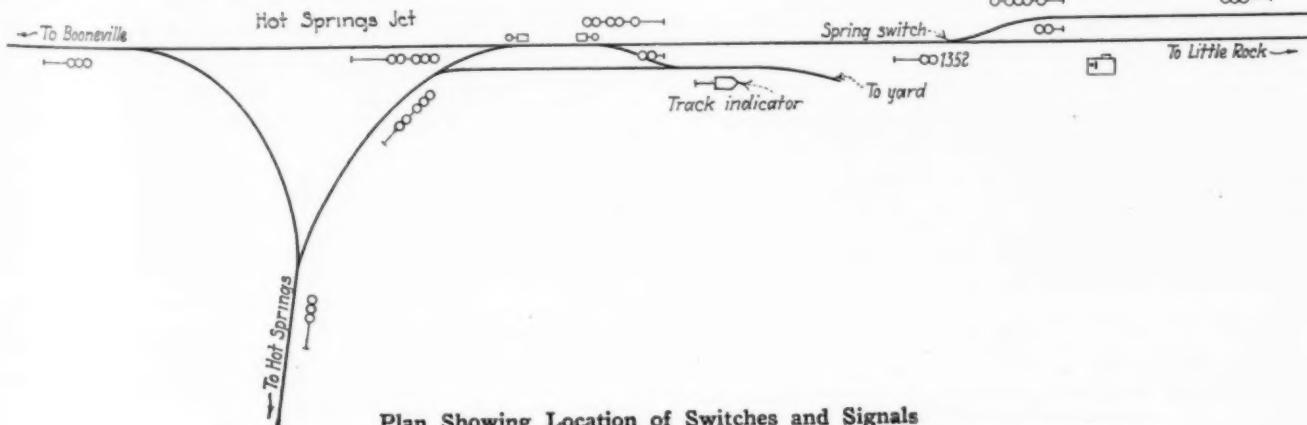
Track Indicator



A Power Switch Machine Used at the Junction Switch

ACREDITABLE saving in train operating costs has been achieved by the Chicago, Rock Island & Pacific as the result of a recent installation of remote-power switches and associated signaling equipment at Hot Springs Junction, Ark. A striking feature of this installation is the use of a large yard-track indicator, which in appearance resembles the annunciators commonly found in Pullman cars, this indicator being located on the yard lead for the purpose of informing trainmen as to the track they should enter. The track and signal layout between Biddle, Ark., and Hot Springs Junction is shown in the plan.

The new arrangement eliminates the necessity of stopping 21 passenger trains and 20 freight trains daily, or a total of 14,965 trains annually. Every passenger train stop eliminated saves at least three minutes and each freight train stop at least seven minutes. This totals 382 train-hours for passenger trains and 851 train-hours for freight trains annually. The elimination of these delays is of such great assistance in facilitating train movements in this area, that it is rather difficult to place a definite money value on these results. However, it is readily apparent that the installation is an



economic success, as well as of decided assistance in train operation.

Within this territory, trains are operated by signal indication entirely, train orders, time table superiority of direction and class being suspended. In this absolute block territory, permission to use the hand-throw switches must be secured from the operator through the medium of the telephone system. Prior to the present arrangement, trains were operated through this territory by means of train orders, time tables and manual block signals. It was the practice to stop all trains at Hot Springs Junction for the purpose of registering and operating the hand-throw switches. It was also necessary for all westbound trains to stop at the end of double track at Biddle to operate the hand-throw switch.

The territory involved is approximately three miles in extent, with a practically level grade and curvature ranging from 1 deg. 30 min. to 7 deg. 30 min.

Five desk-type table interlockers are used to control nine signals and two power switches. There is no mechanical locking between levers, as all checking is done electrically. The usual type of illuminated track diagram is used, with releases, and the "track indicator" control dial is located on the lower portion of this diagram. Route locking is of the "stick" arrangement, being ineffective when no trains are approaching home or distant signals.

Yard Track Indicator

The yard track indicator is used to inform trainmen of the number of the yard track on which their train is to be placed, thus eliminating a stop to ascertain such information on the telephone. The capacity of the indicator is 12 tracks. However, many other combinations can be used if the necessity should arise. The indicator lights are ordinary 50-watt, 110-volt incandescent lamps, set behind a stencil-cut number and are controlled by a Strowger switch, which is actuated by a "dial" impulser located on the operator's desk and made by the Automatic Electric Company, Chicago. The dialing is accomplished similarly to the method in vogue where automatic telephones are used. Energy for the Strowger switch is supplied direct from an electronic-type rectifier which delivers 1 amp. at 50 volts.

Power Switch Machines and Signals

Two Union Type-M electric switch and lock movements are used in connection with dual-selectors. Energy is furnished by 10 cells of Exide Type-EMGO-7 storage battery, which are on a-c. floating charge by means of electronic rectifiers. The dual control levers are painted, one red and one yellow to permit ready identification.

Signals are of the color-light type with red marker units mounted on 5-ft. centers where more than one unit is on the same mast. Signal 1352, which protects the spring switch at Biddle, is not equipped with a background, owing to insufficient clearance, but the absence of the background does not materially reduce the effectiveness of the indication at this particular location, as the range of view is limited to 2,500 ft. The signals are equipped with 10-volt, 10-watt lamps, energy being normally supplied from an a-c. source. All high signals are approach lighted, either through the medium of "DNL" or track relays. The distant signals are automatically controlled by the position of the home signals and the intervening track circuits.

ONE THOUSAND TONS A WEEK is the quantity of fresh fish which a British firm proposes to ship from Canada to Great Britain in fast refrigerator steamers.

A New Orton Crane

ARANGE of operating speeds varying from $1\frac{1}{2}$ to 20 miles per hour is a feature of a new gasoline-operated, four-wheel crane recently introduced by the Orton Crane & Shovel Company, Chicago. Another innovation is an unique arrangement of the cab which is constructed entirely of steel. Instead of occupying a position behind the hoisting drums, the operator's place is in an extension of the cab projecting forward at the right side of the hoist, thereby affording an unobstructed view.

The crane has a lifting capacity of 19,000 lb. at a 10-ft. radius, and can be equipped with a fall block and hook for ordinary lifting, with a sling or chain, or with an electromagnet for handling all kinds of iron and steel parts and scrap. Optional equipment includes a compressor for operating air-driven tools or a generator for operating electric-driven tools. For track laying, the machine, which is full revolving, can be operated from its four-wheel car body, or it can be operated from a flat car, for supply service. Its overall height being only 10 ft., it can be shipped on a flat car.

Gasoline Engine Furnishes Power

Power for all operations is furnished by a 55-hp. gasoline engine of the heavy-duty type. The maximum drawbar pull is 9,000 lb. The car body is built up of structural-steel shapes and plates, which are riveted and electric-welded to form a unit structure possessing requisite strength and rigidity. The axles are carried on standard spring-backed journals. Standard draft rigging and safety appliances are provided.

Only four power shafts are required for the operating mechanism, and each shaft carries a clutch for controll-



The New Crane Employed in Loading Car Wheels
ing its particular function. No clutch is used for more than one operation, so that hoisting, swinging, traveling and radius-varying can be performed independently or at the same time. The power shafts are made of alloy steel, and each shaft can be removed without interfering with any of the others. A "V" type clutch also is provided to control the rapid swinging of the superstructure. The boom is of the four-angle, latticed, box-section type, and is electric-welded.

Three Reasons for Fuel Economy

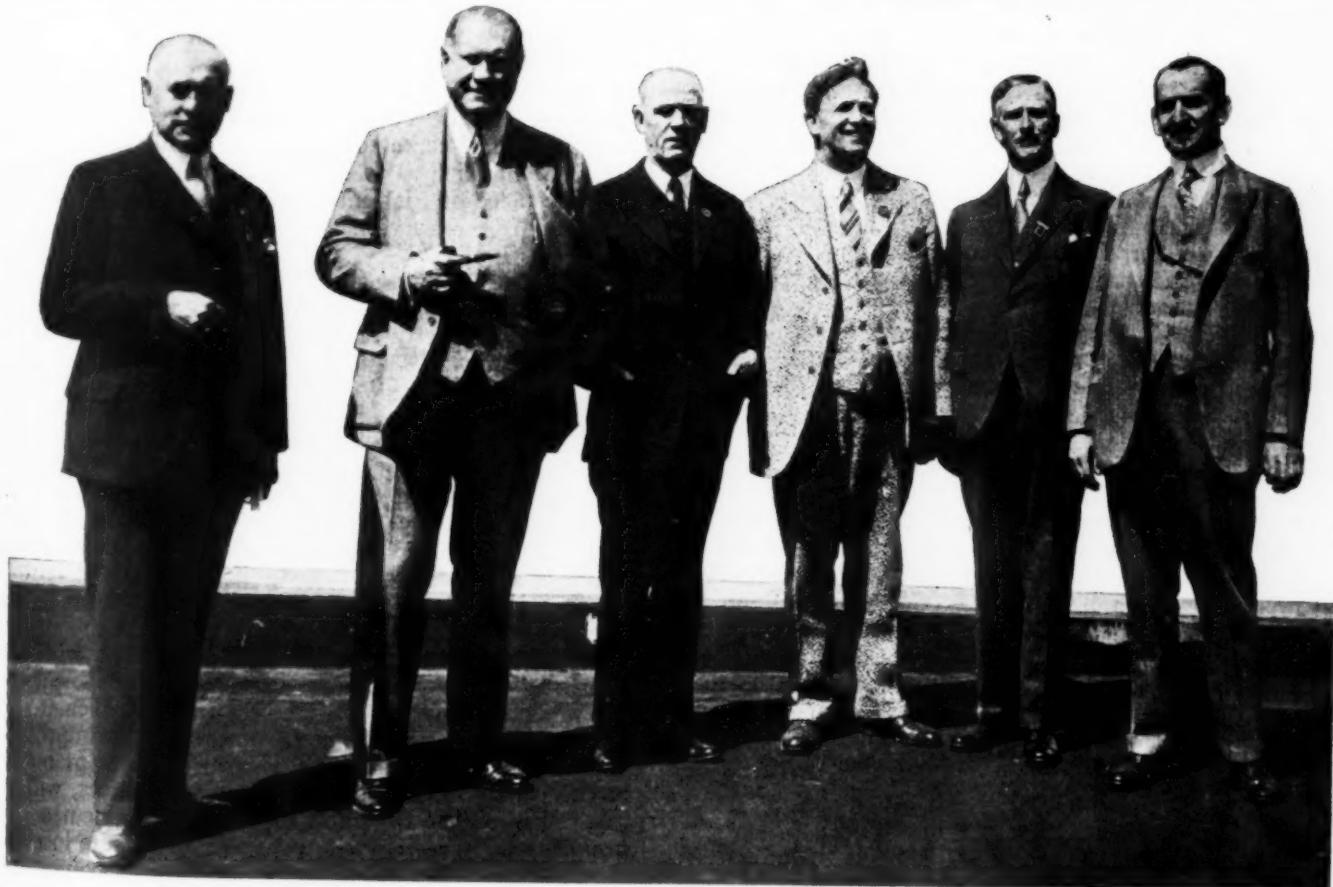
Outlined by J. B. Hill, president, N. C. & St. L., at Fuel Association Convention—Remarks by T. C. Powell

CONSERVATION of natural resources, pride in a job well done and the attainment of operating economies coincident with fuel saving, were given as essential reasons for further intensive fuel conservation efforts by J. B. Hill, president of the Nashville, Chattanooga & St. Louis, at the recent convention of the International Railway Fuel Association. This convention was held at the Hotel Sherman, Chicago, May 7 to 10, inclusive, a preliminary report of the proceedings being published beginning on page 1095 of the *Railway Age* of May 11.

Following Mr. Hill, T. C. Powell, president of the Chicago & Eastern Illinois, spoke briefly, maintaining that the country did not make the railroads, but that the railroads made the country. "When the first railroad was built, 5,000 miles of canals, besides the rivers, lakes, gulf and oceans, were the transportation facilities serving land of 3,000,000 sq. miles," he said. "Imagine what would happen to the farmers if they had to depend on that limited water facility today; image what would happen if three billion bushels of corn had to be moved and distributed by motor trucks. There is nothing in the country right now that can take the place of this immense facility of 250,000 miles of railroad system.

And that indispensable system is dependent on the steam locomotive. It is a system, correlated and operated by its 2,000,000 employees, which best serves a mighty country with a mighty population. Complete electrification would be possible only with the merging of all railroad lines in 15 or 20 systems, and even then the Diesel-electric locomotive costs twice as much as a steam locomotive of equivalent power, and this alone foretells its general use, with the possible exception of smaller sizes for switching purposes. In spite of the agitation for the development of waterways as transportation facilities, the railroads will continue to bear the burden of the country's freight and passenger business. Expense is the greatest stumbling block to electrification. If we were to electrify, who would buy our steam locomotives? We would have to junk millions of dollars' worth of valuable property—not only locomotives, but all of our locomotive works and all of our equipment not adaptable to electric operation." Mr. Powell closed his remarks with the statement that nothing yet devised by man can take the place of steam railroad service.

Other speakers included A. P. Prendergast, mechanical superintendent of the Texas & Pacific, who mentioned the part that the mechanical department plays, in the



Left to Right: T. C. Hudson, Assistant General Superintendent Motive Power, Canadian National, President of the Association; Sir Henry Thornton, Chairman of the Board, Canadian National; Eugene McAuliffe, First President of the Association (1909); M. A. Daly, General Fuel Supervisor, Northern Pacific, Past President of the Association; W. M. Phillips, Manager, Industrial Department, Canadian National, and A. L. Graburn, Assistant General Fuel Agent, Canadian National—Photograph Taken on Hotel Sherman Roof

promotion of fuel economy, not only in the design of locomotives, but in the care of locomotives at engine terminals. Mr. Prendergast mentioned the necessity of properly maintaining boosters, feedwater pumps and other locomotive specialties, on account of their important bearing on fuel economy. A considerable proportion of his address was devoted to a discussion of direct steaming at engine terminals, in which the steam obtained from live locomotives in the engine-houses is used in the work of firing up dead locomotives.

T. W. Demarest, general superintendent of motive power of the western region, Pennsylvania, opened the session devoted to operating problems in connection with fuel economy, with an address, in which he stressed particularly the necessity for further extensions of locomotive runs, and expressed the opinion that it should be possible to run freight cars for 250 or 500 miles without stopping them at intermediate yards for classification, inspection and repairs. Among the striking statements in Mr. Demarest's address, the following may be mentioned: "You can choke a railroad with too much power just as you can with too little. Extended locomotive runs have been most effective in the elimination of intermediate yards. Maximum fuel economy always comes from the minimum of road delays no matter how they are brought about. The further extension of locomotive runs means reduced capital expense because you reduce the number of locomotives in service. It means reduced fuel consumption because of the reduction of time at intermediate terminals."

Mr. Demarest referred to the advantages of large-capacity tenders in eliminating water stops. He said that arch bar trucks and the present method of hanging brake beams contribute largely to train delays and consequently have an adverse effect on fuel economy. He closed his remarks as follows: "As transportation operations improve, so does fuel consumption improve. I am not at all sure but the fuel bill decreases at a faster rate by good transportation operations than it does by anything we can do to the locomotive. What you and I must do is to try, if we are not doing it now, to broaden ourselves and help the management in the elimination of delays, the freer movement of trains, the reduction in intermediate terminals and the increase in the length of locomotive runs."

At the closing session of the convention, the following officers were elected for the ensuing year: President, W. J. Tapp, fuel supervisor, Denver & Rio Grande Western, Denver, Colo.; vice-president, W. G. Black, assistant to the president, Erie, Cleveland, O.; vice-president, C. H. Dyson, fuel agent, Baltimore & Ohio, Baltimore, Md.; vice-president, J. M. Nicholson, fuel conservation engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.

The following were elected new members of the executive committee: J. D. Clark, chief fuel supervisor, Chesapeake & Ohio, Richmond, Va.; J. R. Jackson, engineer of tests, Missouri Pacific, St. Louis, Mo.; Malcolm Macfarlane, general fuel inspector, New York Central, New York City; and A. B. Maurice, road foreman of engines, National of Mexico, Mexico City.

Following is a summary of Mr. Hill's address, and summaries and abstracts of some of the committee reports:

Address by J. B. Hill

President, Nashville, Chattanooga & St. Louis, Nashville, Tenn.

To railroad men, there is no piece of machinery comparable to a modern locomotive, particularly in action. It is a thing which every good engineman and fireman have an affection for as a lover of horses for his own fine steed, or as a lover of dogs for his pet or protector.

Yet it is a different sort of affection. It is one which commands respect and admiration because of the danger, power, mechanical precision and great skill that are locked up in the complicated steam locomotive, the product of the toil of thousands of mechanical engineers, students and expert workmen and representing the accumulated experience of men in machinery for almost a hundred years. Complicated though it be, and though the laws which govern its operation are well known, yet it is more or less crude, in that it utilizes effectively but a small per cent of the energy stored in the fuel it consumes.

Between 1921 and 1928, the consumption per 1,000 gross ton-miles in the use of fuel on American railroads was reduced about 21.4 per cent. The annual consumption on railroads is now about 125 million tons of coal. On the unit consumption of 1921, it would be about 155 million, a saving of 30 millions annually. Should we make no further improvements in fuel conservation, and our annual consumption continue about the same, the savings in 100 years in the available coal supply would equal the aggregate railroad consumption for 20 years. This is a tremendous amount.

We should save coal because of the pride which each of us should feel in a job well done. The tremendous transportation facilities of this country have been developed to their superior position in less than one hundred years. Nothing has contributed more to the development of civilization or is now contributing to the welfare of mankind than has that great distributing agency, steam railroad transportation. A railroad man, therefore, can rightly feel that his work is a useful work; that the work of his brain and his hand devoted to the task of distribution, is something just as essential in this complex civilization as the production of food itself from the soil. No man can do the best in his class, if in his daily tasks he has not eliminated all possible waste. Whatever may be a man's position effecting the use of fuel, he cannot claim to have met its full requirements unless he has helped to convert the potential heat units in every piece of coal, into the greatest possible amount of transportation service.

The work of saving coal should be actively continued, not only because waste should be eliminated, but because there is hardly a phase of railroad operation that is not directly or indirectly favorably affected by an effort to save fuel. Consequently the pursuit of the fuel conservation work to its varied and ultimate end will certainly improve every activity in the production of transportation service. A proper organization relentlessly pursuing the subject each day will fix and quicken the responsibility of everybody involved. The purchasing agent, or whoever makes the contract for coal, will want to know with more certainty whether or not he can buy less ash and more heat units, whether the coal is properly cleaned and prepared, that the proper grade and size are being placed at the proper places on the system and where it will produce the greatest work with the least waste. The equipment purchasers will be keener to know that all new power is the most highly efficient and that as rapidly as possible old power will be improved. The mechanical men, from the superintendent of machinery down through the helpers and apprentices, will be more alert on the condition of power. Enginemen and firemen will strive for the best operation of the locomotives. Dispatchers will be keener on meeting points, and maintenance-of-way men will help them in keeping heavy trains moving with the fewest possible stops. Dead time and standby losses will be reduced. Switch movements will be reduced. Tons-per-train and tons-per-train-hour will be increased. Practically every phase of transportation service will be quickened by the best pos-

sible use of fuel. Just as a man's physical energy responds to the proper utilization of food, in like manner do transportation practices respond to the effective use of coal.

Front Ends, Grates and Ash Pans

The report of the Standing Committee on Front Ends, Grates and Ash Pans was limited to the presentation of two subjects; namely, the use of material other than plain cast iron for locomotive grate bars, and the results of locomotive front-end tests recently made on the Missouri Pacific. The committee sent out a questionnaire to which replies were received from 59 railroads which operate 52,953 locomotives, or about 75 per cent of the total number in service. This questionnaire covered the utilization of materials other than cast-iron; experience with the material used and, if cast iron grates were used, what were the specifications? The answers to this questionnaire showed that of the 59 roads replying, 40 buy or make cast-iron grates without any specifications for physical or chemical properties. These 40 railroads own 24,481 locomotives. It was stated in the report, that while the absence of specifications does not necessarily entail poor material, especially for roads which cast their own grates, it certainly does not make for excellence or uniformity of product. The remaining 19 roads buy or make their cast-iron grates according to specifications, two of them specifying physical properties only. These 19 roads own 28,472 locomotives. Of the 19 specifications received in response to the questionnaire, nine were the same as the specifications for locomotive grate bars adopted by the American Society for Testing Materials.

All of the roads using materials other than cast-iron for grate bars; such as cast-steel and various iron alloys, reported satisfactory service, and a considerable number reported that special grate materials are more economical than cast-iron.

The section of the report devoted to front-end tests on the Missouri Pacific described the work done by that road in an effort to establish a standard front-end arrangement for its 2-8-2, 2-10-2, 4-6-2 and 4-8-2 type locomotives. These series of tests, included in addition to the establishment of a standard front-end arrangement, a study of the improvements produced by eliminating restrictions in the exhaust passages, a study of the performance of six-pronged and four-pronged Goodfellow exhaust nozzles, and a study of front-end performance on a passenger locomotive with special regard to trailing smoke.

The main conclusions arrived at as a result of these tests were that there are great possibilities of improving steam production and decreasing back pressure by means of larger nozzle tips, provided other parts of the front-end design are well worked out; that an increase in stack diameter will often result in improved performance; that for engines of the size and capacity of those now in common use, the old style lift pipe is unsatisfactory, and that the inside stack is more effective than the lift pipe; that in order to secure the benefits available from large nozzles, care must be taken to remove restrictions elsewhere in the exhaust passages; that the Goodfellow nozzle seems superior to the plain tip, and that the six-pronged Goodfellow tip is not generally as good as the four-pronged tip.

The report was signed by Edward C. Schmidt, University of Illinois, (Chairman); George W. Armstrong, Bethlehem Steel Company; W. R. Beasom, Pennsylvania; H. A. Boyer, assistant shop superintendent, Erie; J. S. Breyer, master mechanic, Southern; E. C. Fogh,

Texas & Pacific; V. L. Jones, mechanical engineer; G. H. Likert, fuel engineer, Union Pacific; J. L. Ryan, mechanical and testing engineer, St. Louis-San Francisco; L. W. Withrow, chief motive power inspector, Chesapeake & Ohio; E. G. Young, University of Illinois, and Frank Zeleny, engineer of tests, Chicago, Burlington & Quincy.

New Locomotive Economy Devices

The Committee on New Locomotive Economy Devices reported that there appeared to be no outstanding demand for new devices, but rather a demand for the perfection and more extensive use of devices already available. A summary of the replies to a letter sent out to the railroads by the committee indicated that the railroad managements are largely contented with the operation of the present-day locomotive equipped with such devices as are now on the market. However, the committee believes there is still room for many improvements in the design an application of specialties to add to the efficiency of locomotive operation, and plans to continue its efforts to seek further developments. It reported that the installations of feedwater heaters are about evenly divided between open and closed types. At the end of 1928, of 5,586 locomotive feedwater heaters installed or on order in the United States, Canada and Mexico, 5,155 have reciprocating pumps, 364 have centrifugal pumps, and 67 have reciprocating and centrifugal pumps. A total of 593 heaters installed or on order December 31, 1928, were of the injector type.

A considerable portion of the report was devoted to a discussion of the developments in the limited cut-off. The report states that there is no question but that many existing locomotives could be improved by redesigning the valve arrangement to the limited cut-off, and by the application of starting valves. A locomotive may be changed to this arrangement to have the same tractive force for starting, and such a locomotive would be able to haul trains at greater speed because the limited cut-off makes for a decreased steam consumption, and the resultant effect is an increase in the capacity of the boiler. Many locomotives in existence have too low a factor of adhesion. Such locomotives would benefit by the action of the starting valves and limited cut-off, and would not slip so readily. On existing locomotives, where it is possible to increase the boiler pressure or increase the cylinder bore, it is possible to increase the capacity for starting and hauling tonnage from ten to twelve per cent.

The report also covered such specialties as water-circulating devices, back-pressure gages and cut-off control, air locomotive whistles, improved cab devices, the use of pulverized coal on locomotives and the development in locomotive stokers. One of the interesting subjects which the committee included in its report was a smoke-observation window. This window is a clear-glass opening, 8 in. in diameter, located just above the storm window in front of the cab on the left side. The purpose of this window is to permit observation of the stack from the fireman's seat box. It is well known that a good stoker fireman can regulate his fire by the color of the stack. This window can be applied at a cost of a little over \$2 and has met with the approval of the men working on locomotives on which it has been installed.

The report was signed by George E. Murray (chairman) electrical and mechanical engineer, Grand Trunk Western; J. P. Christiansen, mechanical engineer, Chicago, Indianapolis & Louisville; John R. Jackson, engineer of tests, Missouri Pacific; E. A. Kuhn, engineer

of motive power, New York, Chicago & St. Louis; W. A. Pownall, mechanical engineer, Wabash; H. W. Sefton, supervisor locomotive and fuel performance, Cleveland, Cincinnati, Chicago & St. Louis; S. R. Tilbury, fuel supervisor, Atchison, Topeka & Santa Fe, and G. A. Young, Purdue University.

Other Reports

In this year's report on the inspection and preparation of fuel the committee included a form of report for the initial mine inspection of coal and also a daily mine-inspection report. Considerable space was devoted in the report of the committee to mechanical cleaning and washing, satisfactory results with the latter method, particularly in the Alabama fields, being secured.

The Committee on Stationary Power Plants in its report this year presented a program of subjects for development in future reports to which it plans to devote its attention. These subjects include stokers and furnaces, stacks and breechings, small and auxiliary turbines, power-plant records and logs, superheated steam, coal- and ash-handling, coach heating, location and protection of enginehouse piping, recommendations regarding electric blowers, central-station vs. isolated-plant operation, and power-plant building construction. This year's report also included information concerning the operation of oil-fired power plants with reference to air, steam and mechanical atomization, and the use of oil and steam flowmeters for securing an accurate knowledge of plant operation.

In addition to the reports of standing committees individual reports regarding various coal conferences and activities of the association were presented, as follows: W. L. Robinson, superintendent of fuel and locomotive performance of the Baltimore & Ohio, presented in abstract form a report of the International Bituminous Coal Conference, sponsored by the Carnegie Institute of Technology, and held at Pittsburgh, November 19 to 24, 1928. H. W. Brooks, consulting engineer, gave the convention the benefit of his observations while attending the World Fuel Conference at London, September 24 to October 26, 1928.

Oil-Electric Locomotive Developments*

By W. L. Garrison

Assistant Manager, Locomotive Department, Ingersoll-Rand Company, New York

Of the 43 oil-electric locomotives now in service not one has been equipped with a new cylinder on account of wear, nor had a cylinder reborred and fitted with oversize piston and rings. The addition of centrifuges to clean the lubricating oil continuously, preventing carbon and dirt from getting into the bearings, will undoubtedly lengthen the life of the main wearing parts.

Official figures from the first oil-electric locomotive placed in service, namely the 300-hp. unit at the Bronx, N. Y., terminal of the Central Railroad of New Jersey, show the cost of material for all repairs during 1928 of \$928.81 or 28.8 cents per locomotive hour of service.

The maintenance figures for a 300-hp. locomotive operating 7383.6 hours per year in steel-mill switching shows the cost of material and labor for all repairs during 1928 as 56 cents per locomotive hour.

* From a paper presented at the March 15, 1929, meeting of the New York Railroad Club.

The mechanical and electrical maintenance is similar to that for straight electric locomotives of equal power.

The service oil-electric locomotives perform varies considerably. Some are on single eight-to-ten-hour shifts where the loads are light and the speeds slow. Such service is common in the large cities or at float yards, where their chief advantage lies in giving smokeless and noiseless operation, greater fuel economy and minimum hosting requirements. The oil-engine load factor in such service varies from 9 to 15 per cent.

The operating costs for 1928 of a 300-hp. locomotive in this class of service may be of interest.

Operating Costs of a 300-hp. Oil-Electric Locomotive

	Loco. hour	Loco. year
Fuel	\$.2360	\$ 761.40
Water	.0253	81.45
Lubrication	.0274	88.31
Locomotive supplies	.0631	203.32
Engineman	.9800	3198.83
Repairs	1.6200*	5226.48*
Out of pocket	\$ 2.9518	\$ 9659.79
Interest at 6 per cent.	1.1350	3660.00
Depreciation at 3 per cent.	.5680	1831.80
Cost of operation	\$ 4.6548	\$ 15151.59
* { Material	\$.288	\$ 928.81
* { Labor †	1.332	4297.67

† Labor is high due to local conditions covering overtime and traveling time between shops and locomotive.

Total locomotive cost = 3225.

Fuel oil at \$.054 per gal. Total consumption, 14,100 gal.

Lubricating oil at \$.659 per gal. Total consumption, 134 gal.

Grease at \$.0874 per lb. Total consumption, 932 lbs.

Other oil-electric locomotives are operated three eight-hour shifts per day six days a week throughout the year, performing some 7,383 hours of service out of a possible 8,760, or showing an availability in service of approximately 85 per cent. The service referred to is in a steel mill where all the loads are heavy, and the grades around the blast furnace, open hearth and cinder dump average from 1.5 to 4 per cent. Under such conditions the oil-engine load factor varies from 15 to 25 per cent.

The writer knows of no more exacting test for an oil-electric locomotive than in the transportation service of a modern steel mill. In this service a 300-hp. oil-electric locomotive has turned in the following performance record for 1928 as compared with a 72-ton, six-wheel steam locomotive formerly used.

Comparative Cost of Operation per Locomotive-Hour for Steam and Oil-Electric Locomotives

	Oil-electric, 12 months	Steam, 12 months
Labor	\$1.660	\$3.310
Fuel	.365	1.210
Supplies	.080	.020
Repairs, material and labor	.560	1.070
Enginehouse	.205	.795
Depreciation	.815	.115
Superintendence	.895	1.065
Interest	.505	.115
Total	\$5.085	\$7.700

The average saving per hour for the oil-electric is \$2.615.

One steel company is operating five oil-electric locomotives and another four. These companies are not particularly interested in noise and smoke elimination in new types of motive power, but are primarily interested in economy of operation and reliability for continuous and severe service.

Such economies of operation are possible in railroad yards operating two or three eight-hour shifts daily, and where the elimination of noise and smoke are not necessarily the predominating requirement.

It is somewhat early to set forth the results obtained with oil-electric locomotives in branch-line and main-line service, but this year will see three such units in operation. Their service records will undoubtedly be watched with considerable interest.

Report On

Railways Since 1921

Professor W. J. Cunningham reviews developments for the Committee on Recent Economic Changes—Low return an unfavorable condition

WASHINGTON, D. C.

FROM the railway point of view, the only important unfavorable development in the present situation is the low net return on value, says William J. Cunningham, J. J. Hill professor of transportation at Harvard University, in the chapter on "Transportation" of the survey of the National Bureau of Economic Research, published with the report of the Committee on Recent Economic Changes of the President's Unemployment Conference, made public on May 15.

The committee report is an analysis of post-war developments in American economic life, particularly those since the recovery from the depression of 1920-1921. Herbert Hoover was made chairman of the committee while he was Secretary of Commerce and A. W. Shaw has served as acting chairman in its later deliberations. Daniel Willard, president of the Baltimore & Ohio, was a member. The report of the committee itself deals with transportation only as part of the general economic picture but the survey of the research bureau, on which it was based, contains not only a comprehensive review of the developments of the period in the chapter by Prof. Cunningham but also much incidental discussion of the relations of transportation to other phases of the report. Prof. Cunningham's summary follows:

Expenditures

From 1920 (when railway property investment was slightly in excess of \$20,000,000,000) to 1927, inclusive, the railways have made gross expenditures of nearly \$6,000,000,000 for additions to and betterments of facilities and equipment, an average annual expenditure of three-quarters of a billion. Of the total sum, approximately one-half has been devoted to roadway and structures, principally in additional running tracks, sidings and yards; improved terminals and structures, additional automatic and other signalling, heavier rail, more and better ties; and more and better ballast. The other one-half has been devoted to betterments of equipment. The number of equipment units shows little change—a slight increase in freight cars but actual decreases in locomotives and passenger cars—but the average and the aggregate capacity of the units have increased, and, particularly in locomotives, there have been notable improvements in design and economic effectiveness. In the first few years of the post war period, the expenditures for equipment were greater than those for roadway and structures, but during the latter part of the period the proportions have been reversed. Because of the more effective use of equipment, the additional traffic has been handled with the same or even less units, and orders for new locomotives and cars have been mainly for replacement of units retired.

A little less than one-quarter of the six billions devoted to additions and betterments has been charged to operating expenses or to the profit and

loss surplus. Such charges, in the main, represent the original cost of property or equipment replaced or retired. Something more than two-thirds of the six billions was added to the investment account—the excess cost of the new over the original cost of the old. Less than one-fifth of the six billions has been capitalized by issue of stocks or bonds. For the years 1920 to 1927 inclusive, the gross expenditures for additions and betterments were \$5,878,296,000; the net increase in the investment account was \$4,604,551,000; and the net increase in railway capitalization in stocks and bonds was \$1,142,761,000. These figures indicate that the greater part of the gross expenditures for betterments and of the net increase in investment was financed from income or surplus and has not been capitalized. That conservative policy on the part of the railways was not altogether one of choice, but was made necessary by the practical inability of the typical railway to sell stock, and the high rates of interest or heavy discounts required to make the bonds marketable. An unhealthy tendency is apparent in the growing proportion of funded debt of total capitalization. The funded debt proportion grew from about 50 per cent in 1910 to 58 per cent in 1920 and to 59 per cent since 1923.

Traffic

Railway freight traffic since 1920 has had a general (but slight) upward tendency. The ton-miles of 1923 and 1926 were of record-breaking volume. The former peak loads were in 1918 and 1920. Taking 1918, a war year, as 100, the successive peaks were 101 in 1920, 102 in 1923, and 1925, and 109 in 1926, and 106 in 1927. The number of loaded cars shows relatively greater increases than ton-miles but the loaded car unit does not take into account the tendency toward a smaller carload. Railway passenger traffic, in contrast to the slight increase in freight, is steadily and seriously diminishing in volume. Since 1920 each year, with the exception of 1923, has had a smaller total passenger-miles than the preceding year. The passenger-miles in 1927 were 28 per cent less than in 1920. The loss is almost entirely in local passengers, and is owing mainly to motor vehicle competition. Long distance passengers and commuters have been increasing slightly.

Motor Competition

The effect of motor truck competition on railways, while it has diminished the volume of l.c.l. freight and has taken away some tonnage in carload lots in a few other commodities, is not serious. Relatively the freight lost to trucks is a small part of the total, and it is the least remunerative of railway freight. The small-shipment, short-haul freight traffic is burdensome in its demands upon equipment and facilities, and the railways are better off when the equipment and facility released by the loss of freight to trucks is employed for the long-distance bulk-freight which is more attractive from the point of view of net revenue. In railway passenger service, however, the loss in local passengers to automobiles and motor coaches is substantial and serious and is narrowing the already small spread between railway passenger revenues and passenger expenses. To meet the new form of competition, the railways are improving the schedules and equipment of the through trains, and are entering the motor



Prof. W. J. Cunningham

coach field themselves by substituting motor transportation for branch-line trains or paralleling their rail lines by motor coach service. The greatest loss to the railways, however, is not in the passengers taken by motor coaches, but in the greater use of the private automobile as a substitute for railway transportation.

Rates

Shortly after the Transportation Act was passed in 1920, the Interstate Commerce Commission, acting under the new rule of rate-making, authorized rate increases which were intended to yield a 6 per cent return on railway property value. The average advance in freight rates was between 30 per cent and 35 per cent; in passenger service the mileage rates were increased about 18 per cent and Pullman fares were advanced 50 per cent. These heavy increases did not, however, yield 6 per cent on property value as the 1921 traffic fell off sharply. After the initial attempt to adjust rates so as to yield a specified rate of return, as required by law, the commission apparently has given less attention to the relation between rates as a whole and fair return than to the downward adjustment of specific rates, notably on agricultural products. The average revenue per ton-mile in 1921 was 1.275 cents; in 1927, it was 1.080 cents. The ton-mile revenue is not always an accurate index of relative rates but in this case it is indicative of reductions since 1921. These reductions, on the basis of the differences between the ton-mile revenue of 1921 and of subsequent years up to and including 1927, have saved the shipping public over \$4,000,000,000, or at the rate of \$670,000,000 per year. In passenger service, the rates have remained substantially the same since the advances of 1920 although, on the one hand, the tendency has been to offer the public more opportunities in the form of reduced excursion or tourist rates, and, on the other hand, there have been advances in suburban fares in some localities. The revenue per passenger-mile has declined from 3.086 cents in 1921 to 2.896 cents in 1927, but the increase has been the result not only of the greater use of excursion tickets, but also of higher proportions of through passengers and suburbanites, and of lower proportions of local passengers who travel on the highest passenger-mile rates.

Labor

When the railways were restored to private operation after the war, the employee morale, in common with employee morale in nearly all industries, was seriously impaired. Relations were further strained when the Railroad Labor Board reduced wages in 1921 and 1922, and took away certain favorable rules, and the service was adversely affected by a nationwide strike of shopmen in 1922-1923. The Railroad Labor Board, created by the 1920 law, did not function satisfactorily, and it was replaced in 1926 by a Board of Mediation. The process of mediation as a substitute for the offices of the Railroad Labor Board (on which the public members held the deciding vote) has not yet been subjected to a severe test. The Labor Board was not successful in avoiding disputes, and mediation since 1926 has maintained peace. The average wages per hour and per year, while less than those of the war period, have been gradually increasing since 1923, and the employee morale has shown an improvement. Employees are co-operating effectively with management in increasing the efficiency of operation. The traffic units per man-hour were 17 per cent greater in 1926 than in 1920, and 10 per cent greater than in 1923, but the major part of the gain is attributable to improved facilities and equipment.

Marked Increase in Efficiency

The most notable achievement in railroad administration since the war has been the marked increase in the efficiency with which equipment has been utilized and trains operated. The car-miles per car-day have been increased from 25.1 in 1920 to 30.3 in 1927, and the ton-miles per car-day from 498 to 518. The 11 per cent more ton-miles of 1926 (the high record) compared with 1920, were produced with but 2 per cent more freight cars, notwithstanding a smaller average carload (over which the railways have little control) and a larger percentage of empty car-miles resulting from centralized distribution in shifting surplus cars from one region to another as needed for prospective loading. Unserviceable freight cars and locomotives have been reduced materially in number. In train service there has been a steady and consistent gain in the train load from year to year since 1920, with a similar consistent gain in train speed through a reduction in road decent. In 1920, the gross load per train (cars and contents) was 1,443 tons; in 1927 it was 1,780 tons, a gain of 24 per cent. In 1920, the average train speed between terminals was 10.3 miles per hour; in 1927, it was 12.3 miles per hour, an increase of 19 per cent. In the inclusive unit combining load and speed—gross ton-miles per train-hour—the gain was from

14,876 to 21,945, an increase in efficiency of 48 per cent. This impressive gain in production per train-hour was not purchased at the expense of higher ton-mile cost, as the operating ratio for the service as a whole has been brought down from 82.7 per cent in 1920 to 74.6 per cent in 1927, notwithstanding rate reductions and losses in passenger traffic. The greater efficiency in fuel consumption stands out as a single item. The savings in coal in 1927, in comparison with 1920, were 19 per cent in freight service and 13 per cent in passenger service (on the basis of consumption per ton-mile and per car-mile, respectively), and were the equivalent in train service alone to economies of \$62,000,000 per year. Through better administration of material and supplies held for use in maintenance, operation and construction, the savings in carrying charges in 1926, in comparison with 1920, were about \$32,000,000.

Low Net Return on Value

From the railway point of view, the only important unfavorable element in the present situation is the low net return on value. The 1920 law was intended by Congress to give the railways a reasonable assurance of a fair return, but the rate-making policy of the Interstate Commerce Commission has not been consistent with that intention. The commission, effective in 1922, defined a fair return as 5½ per cent on value, but in no year since the law was enacted in 1920 have the railways earned that return. The work of valuation of railroad property is not complete, and in its present stage is surrounded by many uncertainties which are yet to be cleared up by the Supreme Court, but it seems not at all unlikely that the final value, when determined, will be little different from the investment cost carried on the railway books. On that value, plus working capital in cash and materials held for use, the net return in operating income was 2.9 per cent in 1921, with a gradually increasing rate up to 4.8 per cent in 1925 and 5.2 per cent in 1926, the year of greatest freight traffic volume and greatest gross revenues. In 1927, with slightly less traffic, the return was but 4.5 per cent, and, for the first ten months of 1928, it was at the rate of 4.7 per cent. The average for the seven years ended with 1927 was 4.3 per cent, a rate inadequate as a reward for taking the risks of investment, and plainly below the reward that Congress intended as an incentive to adequate transportation service to the public when the Transportation Act was passed. The additional investments of the past eight years have been made with faith in the assurance of a fair return. Although the fair return has not been earned on the total investment, it is likely that it would have been even less without the additional investments, as they not only made it possible to produce the greater volume of transportation since 1923 but also to produce it at lower cost. There is a limit, however, to the extent to which new dollars can be devoted to saving old dollars already invested, and the present policy of betterments cannot long be continued on an average return of 4.3 per cent on the whole.

Consolidation

Little progress has been made in carrying out the provisions of the Transportation Act pertaining to the consolidation of all railways into a limited number of systems of fairly equal financial strength. The purpose of that part of the act was to simplify the problems of rate-making and to insure reasonably uniform returns under uniform rates to all of the railways in any region. The Interstate Commerce Commission was directed to prepare a final plan to which all proposals should conform, but the commission has reached the conclusion that the task is too difficult, and no final plan has been published. In the meantime, no consolidations can take place because, according to law, none can be approved unless it is in harmony with the commission's final plan not yet prepared. All that can be done is to approve unifications by lease or stock control, but short of actual consolidation. A few such proposals have been approved and others are before the commission but the law, instead of bringing about the long-intended large-scale consolidations, has, because of the inability of the commission to prepare a final plan, acted as a brake upon the long-time natural process under which the existing systems have grown.

From the public point of view, the outstanding railway development since the war has been the marked improvement in transportation service. The adequacy, speed, and dependability in freight movement have never been better. The improvement is seen in freedom from car shortages, embargoes, and other restrictions, and in close adherence to scheduled transit times. The number of scheduled fast freight trains has been increased and the speed bettered, so as to give earlier deliveries at destination. Incidental services have been extended, and throughout the whole service there is greater effort to apply modern merchandising principles in the development and sale of trans-

portation. The regularity of movement and dependability in rail service have given impetus to the general practice among manufacturers and merchants of carrying smaller inventories of raw materials and merchandise. Better rail service cannot be credited wholly with this economic development, but it called attention to the possibilities and led to the general movement. Certain it is that the smaller stocks would not afford adequate protection, were rail service less prompt and reliable. The general reductions in inventories have released sums of capital which in the aggregate are enormous, and in buying habits have brought about profound changes which are far-reaching in their economic effects.

Transportation and Agriculture

The chapter on "Agriculture", by Dr. Edwin G. Nourse, head of the agricultural section of the Brookings Institution, includes the following in a discussion of the relations between transportation and agriculture:

The speed and economy of truck hauling in certain instances has already been referred to. As an offset to this, however, the development of automotive vehicles and the coming of hard roads has resulted in the abandonment of a considerable mileage of branch line railways, and in the disappearance or dwindling activity of many small country villages such as formerly afforded a local market for many farmers' products and the effects most noticeable for the farmer are to require further readjustment of his business to meet these changed transportation conditions . . . In many sections the loss of railroad service through the closing of stations where business was small or the entire abandonment of lines, has worked a hardship on the farmers. They have also complained that the general level of freight rates upon farm products is unduly high in view of the present prices of many agricultural products and in comparison with rates charged on other classes of railway traffic. In the final analysis they agree that the quality of service is so important that the roads must have earnings which will defray not merely operating costs but permit of the installation of facilities which will give to agricultural products a service of maximum speed and minimum possibility of deterioration.

While the Hoch-Smith resolution has called for a complete review of this situation, the whole of the rate structure is so intricate and involves such controversial issues between economic groups and geographical localities as to afford little hope of extensive reductions on the farmer's product. The railroads are already at a level of technical efficiency which precludes any sweeping changes from that direction, and the lowering of labor charges, which would be the other chief avenue of approach, seems clearly out of the range of possibilities.

The real question at issue involves theories of rate-making on the one hand and some very fundamental issues of agricultural economics on the other. Traditionally we have leaned toward the idea of making freight rates on the rather low-priced and bulky products of the farm which would stimulate the most rapid development of resources, no matter how remote from consuming centers. More serious thought, however, needs to be given to the implications of this theory under present conditions. Since wheat and cotton are both depressed industries, and the competition is from the geographically more remote fringes of the producing areas, it is at least interesting to speculate on what would be the effect of a stricter application of the cost of service theory of rate-making. If, as has been suggested earlier in the chapter, the present trend of events threatens to undermine values in the older sections, cost of service rates might tend to conserve the interests of a rather large agricultural section. On the other hand, so far as higher freight rates on food commodities and agricultural raw materials impose a burden on the distant consuming centers, the maintenance of higher rates might conceivably tend to stimulate the decentralization of population toward the agricultural producing sections to their ultimate benefit. As a single example, low freight rates on cotton would inure to the advantage of the New England mills; high rates to the southern mills. Which do the cotton-growing states want?

HE WHO HESITATES IS NOT LOST.—if he is doing safety stuff. This is one of the salient points in a safety poster which has been issued by J. J. Rhoads, superintendent of the Allegheny division of the Pennsylvania. The poster summarizes the accident statistics of the division for the month of April, which record, says the circular, "is not so bad". The figures are summarized as follows: Total injuries in April, 1928, seven; in April, 1929, one. This is the record of reportable accidents. A significant feature of the circular, however, is a supplement, at the bottom of the page which shows all accidents on the division, which numbered 16. The one reportable accident necessitated an absence of 45 days for the victim. Of the other 15, one brakeman lost one day and a hostler lost two days; the other items read: disability, "none." In this list of minor accidents, trackmen figured in four cases and freight firemen in two; other classes are represented by one each.

* * *



The D. L. & W.'s "Lackawanna Limited" Westbound between Hoboken and Newark, N. J.

Roads Prepare to Reduce Export Wheat Rates

WASHINGTON, D. C.

THE efforts of the railways to comply with the request of President Hoover that they reduce their rates on export wheat have not met with entirely smooth sailing. Although the program was originally based on the accumulations of wheat, the roads were practically forced, by the competitive relation between wheat and flour, to propose similar reductions on the manufactured product, and after their applications for permission to establish the rates on short notice had been filed with the commission further obstacles were encountered in the protests of western grain interests that certain changes in relationships would result from the tariff provisions as proposed and their objections as to the effect of the limitation date on grain in transit at the expiration of the emergency period. Legal questions as to the exact form of the tariffs also were involved.

Although the western roads had proposed to make their tariffs effective on May 15 the commission had not yet acted on their application by that date, although it had acted on the earlier application covering the ex-lake rates on wheat. Instead, the tariff-publishing agents were called to a conference with representatives of the commission's Bureau of Traffic on the legal and other details of the proposed tariffs, which were being ironed out on May 15.

The commission on May 11 issued a sixth section permission order authorizing the eastern roads to publish on one day's notice tariffs reducing the ex-lake export wheat rates by 3.33 cents per hundred pounds, applying from Buffalo and other lake ports to north Atlantic ports, effective not earlier than May 12. At that time no application had been filed covering the rates on flour or those from Chicago and St. Louis.

At the same time the commission made public the applications filed by E. B. Boyd on behalf of the western railroads for authority to publish one one day's notice effective on May 15 the reductions proposed at the meeting in Chicago on May 7, in a special export tariff applying on wheat and wheat flour. One of the applications covered transit arrangements, providing that the rates shall apply on tonnage on hand at transit points specified which shall have been shipped from point of origin prior to the effective date, subject to the time limit prescribed in transit tariffs of individual lines.

The special export tariff of the western lines is to bear on its title page a statement beginning: "This emergency tariff is issued at the solicitation of the President of the United States," and stating that the rates are only to be construed as indicative of the attitude of the carriers to assist the Administration in its program for relieving an emergency to the extent that this abnormal reduction in rates may help the situation.

The principal development at the informal conference called by the Interstate Commerce Commission on May 9 to consider the situation was the announcement that the executives of the eastern railroads, meeting at the same time in New York with representatives



of the flour-milling interests, had decided to make their proposed reductions applicable to wheat flour but to exclude all grains other than wheat, thus making their action correspond to that taken by the western lines at their meeting in Chicago on May 7.

This eliminated most of the opposition which had been expressed in protests filed with the commission except that of the operators of barges on the New York Barge Canal, who were very much in evidence, and who asserted not only that the reductions in rail rates proposed would subject them to ruinous competition but also that they were unnecessary and would have little effect in reducing the accumulation of wheat at Buffalo. They pointed to the gradual reduction in the market price of wheat which had taken place since the announcement of the proposed rate cut and also declared that if the rates should have the effect of relieving the congestion at Buffalo the elevator space would immediately be refilled with Canadian grain.

An explanation of the railroad attitude was given by Robert N. Collyer, chairman of the Traffic Executives' Association, Eastern Territory, who announced the result of the meeting in New York, and who explained that the eastern roads themselves had decided on April 25 not to reduce the export grain rates but had later concluded, through their executives, that it would be a reasonable thing for the railroads to do to accede to the suggestions of the Administration in an effort to reduce the accumulation.

No representative of the agricultural interests or of the western railroads participated in the conference, and the urgent requests that the commission allow the emergency tariffs to become effective were made by representatives of exporters and elevator operators. The point most stressed was that navigation on the barge canal had been delayed for 25 days—by high water—and that a large quantity of grain in storage at Buffalo had been sold abroad at prices based on the low canal rates so that the exporters desired the railroad service at an emergency rate to enable them to fulfill their contracts.

The barge operators insisted that they would be able to move the grain as fast as there was any real demand for it but their protests against the rate cuts on the ground of the effect on their business were usually met with a remark from Commissioner Meyer, who presided, that the problem in which the commission was interested was the national emergency created by the existence of a surplus of some 250,000,000 bushels of grain in the country. In concluding the conference Commissioner Meyer said that it was not for the commission to say whether the plan would work in one way or another, in view of the reasons given for it by the Department of Agriculture and the railroads, which

he said had men on their own staffs familiar with the grain business, but that it could only express its willingness to let the experiment be tried.

Mr. Collyer said it would be necessary for the eastern roads to amend the incomplete application filed by W. S. Curlett on May 3, because of the decision to apply the rates to wheat and wheat flour only, and also to cover the rates from St. Louis. Whereas it had been proposed to reduce the reshipping rate from St. Louis from 26½ to 20 cents, and the rate from Chicago from 22½ to 17 cents, it had been decided that the St. Louis rate should be 21 cents, to maintain the usual relation of 4 cents over the Chicago rate. He said the eastern roads had proposed to make the reductions on grains in order to clear the channels, which were just as effectively blocked by corn or oats as by wheat, but that millers all over the country had demanded a similar reduction on flour and after the western roads had acted the eastern conference with the milling interests had been arranged before the commission had called its conference.

The question of exports has been very much on the minds of the railroads for some time, he said, but after very thorough consideration the eastern Traffic Executives' Association had reached the conclusion on April 25 that there should be no reductions on grain or grain products. A few days later it had developed that the Administration was very much interested in this agricultural situation and on representation of conditions deemed by the Administration and accepted by the carriers as constituting a national emergency the conclusion was reached by the executives that the reductions as proposed should be undertaken.

At this point Commissioner Meyer suggested that figures be put into the record showing the large accumulation of wheat in the country. He said that from various sources he had been informed that the surplus approximated 250 million bushels and that the commission had been advised that every elevator at Buffalo was loaded to the roof, while vessels in the harbors awaiting unloading could not be placed.

Various figures were introduced, showing over 30 million bushels on hand at Buffalo and it was stated that Montreal was also blocked and that the New York canal had been utterly incapacitated. C. J. Austin, of the New York Produce Exchange, read from reports showing that on April 27 there were in the terminal markets 114 million bushels of wheat, 28 of corn, 10 of oats, 7 of rye and 6 of barley, in addition to large amounts on the farms and in Canada.

Many questions were asked of Mr. Collyer regarding the application of the reductions and he said it was the intention to have the emergency rates apply on all grain in the elevators on the effective date.

W. C. Mott, of the New York Produce Exchange, urged that the emergency rate be made effective as soon as possible to avoid large losses on the part of the exporters who had sold grain in dependence upon the canal rate. He said the canal boats could not handle the grain rapidly enough but that with rail service at a reduced rate the Buffalo situation could be relieved by 15 to 18 bushels in a short time. Asked by representatives of the canal operators if the contracts had not been made on the basis of the existing rates, he said that the only way grain can be sold abroad is on the basis of the canal rate or the Canadian rate via Montreal. He said the canal would be used to the extent of its capacity but that rail service is needed to relieve the emergency.

E. S. Walsh, chairman of the New York Canal Operators' Association, denied that the canal was not functioning, saying that it had moved 250,000 bushels

the day before and that it would soon be able to relieve the Buffalo situation. On the other hand, he said, the canal operators could not handle any wheat in competition with the proposed rail rate. E. T. Douglas, of the Buffalo Corn Exchange, described the Buffalo situation and said that all the canal boats could handle in a short time would be but a "drop in the bucket." He said that in recent years the railroads have been handling only the surplus out of the Buffalo, because their rates are prohibitive, but that now every avenue of outlet is needed. Asked if the Buffalo elevators would not load up again with Canadian grain he said he saw no reason why they should not take what is offered them. L. W. Lake, representing the Canal Carriers' Association, said he feared the railroads had an ulterior purpose of "absolutely freezing the canal operators out of business," because the latter cannot operate without a two-cent differential under the rail rates. Mr. Walsh took the floor again to say that if the railroads carry the grain to New York there would be no place to put it and that there is no market for the wheat abroad. Mr. Mott retorted that more than half of the wheat now at Buffalo had already been sold abroad. Mr. Walsh said the reduction in rates would merely move grain from one point in the United States to another whereas the canal would gradually relieve the accumulation as fast as there is any likelihood of the grain being moved. He said the state of New York had spent \$250,000,000 on the canal and that if given a chance it would eventually afford permanent relief for such situations as now exist at Buffalo.

J. P. McGill, of the Maritime Association of the Port of New York, raised the question as to why there is so much grain tied up at Montreal, Buffalo and other points if there is any demand for it abroad and cited the recent reductions in the price of wheat. Commissioner Meyer said the commission does not decide on the efficiency of the various remedies proposed to it.

Another representative of the canal operators pointed out that the period proposed for the emergency rail rate would be about 75 per cent of the canal season and said that a reduction of 2 cents a bushel in the rail rate would force the canal rate down to between 3 or 4 cents. When Mr. Mott said he would offer 5 cents for all the wheat the canal could carry he replied that last year the canal rates ranged from 5 to 6½ cents and that the operators could not live on the minimum rate.

Sydney Anderson, representing Minnesota milling interests, urged the commission to allow the emergency rates to become effective. He said there is a real emergency due to the fact that exports this year have been approximately 50 million bushels less than the year before and that the present excess accumulation in the elevators is about that amount. He estimated the carry-over of wheat at the end of the crop year as 190 to 254 million bushels.

Reductions in the export wheat rates of the Inland Waterways Corporation barge line, approximating 33½ per cent, to meet the reductions in rail rates, have been authorized by the Secretary of War, it was announced on May 11, in a statement estimating that the reduction would move between 3 and 4 million bushels. The reduction was proposed on the recommendation of Gen. T. Q. Ashburn, chairman of the board of waterways corporation, in accordance with the policy of maintaining a differential under the rail rates. The rates announced to New Orleans are 10 cents per hundred pounds from the Twin Cities, 9.7 cents for Burlington, 13½ cents from Kansas City and Omaha, 6 cents from St. Louis, and 4½ cents from Cairo.

New Books

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Before Railroads—A Contemporary View of the Agriculture, Industry and Commerce of the South in the Forties. Extracts from reports and letters, including one of John Edgar Thomson, then Chief Engineer of the Georgia Railroad, presenting a vivid picture of pre-railroad times. 16 p. Pub. by Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn., *Apply*.

Electrification of Railways—A List of References to Material Published 1926—March 1929 Inclusive. Indexed by authors and by countries. 35 p. Pub. by Library, Bureau of Railway Economics, Washington, D. C., *Apply*.

An Introduction to a Study of the Regulation of Public Utilities, by Julia Margaret Hicks. Discusses growth of public utilities, growth of "public interest", agencies of regulation, the factors of regulation (service standards, rate of return), and the relation between securities issued and the value of the property. 82 p. Pub. by National League of Women Voters, Washington, D. C., 20 cents.

Transportation. Addresses at the Chicago Railway Equipment Company's 36th annual dinner which include President Leigh's greeting, p. 1-2, "The Evolution of Transportation," by Frank W. Noxon, p. 2-13, "The Railways and the Highways" by Samuel O. Dunn, p. 13-19, "The Airways" by Earle H. Reynolds, p. 19-27, "The Waterways" by Dr. Harold G. Moulton, p. 27-28, and an address by James A. Emery, p. 40-51. 51 p. Pub. by Chicago Railway Equipment Company, Chicago, Ill., *Apply*.

Young Blood, by Francis Lynde. A railroad novel featuring a general manager's efforts to put his road on its financial feet. Pub. by Scribner's, New York City. \$2.

Periodical Articles

The Nicaragua Trade Route, by Walter E. Edge. "America is now recognizing the necessity of preparing for another interoceanic canal." Saturday Evening Post, May 11, 1929, p. 29, 155, 157.

The Problem of Prosperity, by Carl Snyder. Booms and depressions, their characteristics in the last sixty or seventy years, both financial and psychological, with some suggestions for the future. Journal of the American Statistical Association, March 1929, p. 1-14.

The Proper Function of Inland Waterways in the Transportation Scheme of the Nation. Discusses relation of waterways to railroads, efficiency of inland waterways, inland waterways as supplemental service, comparative costs of service. Security Owner, May 1929, p. 14-16.

Railway Merger Plan Submitted. "Porter draft, though similar to 1921 program, of three-fold importance—linked to Northerns." Barron's, May 6, 1929, p. 6.

What Rights Have Railroads? Several penetrating questions raised. Review of Reviews, May 1929, p. 34.

THE RAILROAD BRANCH, of the Young Men's Christian Association at Grand Central Terminal, New York City, has bought the site for a new building on East Forty-seventh street, between Second and Third avenues, one block east of the railroad premises. The Association's present building, at 309 Park avenue, is to be torn down to make way for a new hotel. The new building will not be completed for more than a year.

Looking Backward

Fifty Years Ago

The Ohio Senate has passed a bill which provides that it shall be unlawful for sleeping car companies to charge more than 50 cents for a single berth, 75 cents for a section and \$2 for a stateroom for each 300 miles or less—*Railroad Gazette*, May 16, 1879.

The Master Mechanic Association at its twelfth annual meeting at Cincinnati, Ohio, on May 14, voted by a large majority to adopt the longitudinal dimensions of the Master Car Builders' standard axle as a common standard for axles for all new or reconstructed tenders and cars. This axle has a journal diameter of $3\frac{1}{4}$ in., a journal length of 6 ft. 3 in. and a weight of 335 lb.—*Railway Age*, May 15, 1879.

The Philadelphia & Reading on May 14 took possession, as lessee, of the North Pennsylvania and the Delaware & Bound Brook, which operate about 119 miles of line. This step gives the Reading control over the direct outlet of the Lehigh Valley from New York and a line to tidewater at Port Elizabeth, N. J., and Port Johnson through a connection with the Central of New Jersey.—*Railroad Gazette*, May 16, 1879.

While Detroit, Mich., is agitated about the construction of a bridge over the Detroit river, the Central Pacific has started the construction at Oakland, Cal., of a ferry boat which will convey trains across Carquinez straits. It will be 425 ft. long and 116 ft. wide, accomodating 48 freight cars or 24 passenger cars. The cost of the boat will be \$400,000.—*Chicago Railway Review*, May 17, 1879.

Twenty-Five Years Ago

W. J. Harahan, assistant general manager of the Illinois Central, has been promoted to general manager, with headquarters at Chicago.—*Railroad Gazette*, May 20, 1904.

C. R. Gray, general manager of the St. Louis & San Francisco, has also been appointed general manager of the Chicago & Eastern Illinois.—*Railway Age*, May 20, 1904.

The New York Central has decided to use electricity for the operation of both suburban and through passenger service from its New York terminal at Forty-second street to Croton, a distance of 35 miles on the Hudson division, and to North White Plains, a distance of 25 miles on the Harlem division. The boldness of this project leaves no doubt as to the confidence of the New York Central officers in the ultimate advantages of electricity for suburban traffic such as is handled by that road.—*Railroad Gazette*, May 20, 1904.

Ten Years Ago

On April 30 the Railroad Administration had stored nearly 19,000 standard freight cars because they had not been accepted by the railroad companies.—*Railway Age*, May 16, 1919.

N. L. Howard, until recently colonel in command of the Thirteenth Engineers (Railway) Regiment and formerly division superintendent on the Chicago, Burlington & Quincy at Hannibal, Mo., has been appointed assistant to the federal manager of that road at Chicago.—*Railway Age*, May 16, 1919.

The government's plan of stabilizing prices through the efforts of the Industrial Board of the Department of Commerce has finally collapsed, thus leaving prices subject to the law of supply and demand. After having failed to reach any agreement with the steel interests on lower prices than those announced by the Board, the Railroad Administration has asked for competitive bids on 200,000 tons of rails.—*Railway Age*, May 16, 1919.

Odds and Ends of Railroading

A "Spirit" Train

A "ghost", or rather "spirit" train has appeared near Leningrad. Peasants saw the train stop and, as it remained stationary for some time, investigated the situation. They discovered that the driver and stoker were peacefully sleeping off an overdose of vodka and had allowed the engine fire to die out. There were no passengers.—Sunday Dispatch, London.

A Railroad Bull

Otis Dougan, powerhouse engineer for the Missouri Pacific at Little Rock, Ark., owns the only canine deputy sheriff in the country. Joe is a pet bulldog and a Missouri Pacific booster and customarily appears in a regalia consisting of a hat, horn-rimmed spectacles and a pipe or a cigar. In honor of being an accredited deputy sheriff, Joe wears on his harness a holster and a revolver.

Captain and Judge

Judge Joseph J. Beckham, of the Jacksonville, Fla., municipal court, likes to be called "Captain" as well as "Judge" and occasionally dons his conductor's uniform to make a trip on the Southern for one of his brother conductors in an emergency. For instance, recently the regular conductor on the north-bound Kansas City-Florida Special was ill at Jacksonville and Judge Beckham was pressed into service. The Jacksonville Times-Union carried a story the next day to the effect that "the Judge runs other things besides Jacksonville's Municipal Court."

A Fruit Stand on Wheels

Use of old railroad cars for commercial purposes is not infrequent, but few receivers of freight go further than that and hold cars which are still in good condition out of circulation for long periods. According to the Wall Street Journal, a service division man tells the story of a receiver of perishables, who unloaded a car of fruit fairly promptly after its receipt, but then immediately placed steps at the car door, put up counters and electric lights, set up a store and sold fruit, candy, cigars, cigarettes and chewing gum. The local agent did not report the situation because of the assertion of the consignee that the car was his as long as he paid demurrage on it, and it was nobody's business what he used it for. It was about a month before the car service division found out what had happened and set the car rolling again.

A Deferred Payment

E. K. Wherry, of Cedar Rapids, Iowa, is convinced that the Chicago & North Western pays its debts. He is exhibiting a check for \$2.50, sent out from the Chicago offices of the company a few days ago, for services performed in 1881, 48 years ago. Almost five decades ago Wherry and his brother arrived in Clinton, Ia., when the biggest blizzard the state ever had known was raging. They were hired to help clear the tracks. When Wherry received his check and that of his brother for "services performed as a snow shoveler in March, 1881," it was admitted that the clerk in the long ago had got the name wrong and that was the reason for the long delay.

Minstrel Days

Some of the old-timers may remember "Gene Morse", one of the best known minstrels of the 80's and 90's, who played with George Primrose, Billy West, Joe Hawkins, Bert Brockway and other popular minstrels of that day. He performed on the banjo, violin, harp, mandolin and piano, in addition to singing and dancing. "Gene Morse" is now on the payrolls of the Buffalo, Rochester & Pittsburgh, as a crossing watchman at Rochester, N. Y., under his real name of Eugene Elman. He left the stage 30 years ago to devote himself to chemistry and still makes medicines for drug firms in his laboratory at Rochester.

Fast Computer Dies Counting Cars

William Strong, the man who could compute figures with the speed of an adding machine and never knew how he did it, is dead, but he has left many interesting stories relating to his remarkable mental eccentricities. Strong, who was 50 years old and who lived in Peoria, Ill., died recently on a railroad viaduct in a suburb of Peoria, where he was in the habit of going daily to perform the feat of adding up box-car numbers "just to keep in practice," as he said. He would stand beside a railroad track as a long freight rolled by, observing the car numbers. When the caboose flashed past, he would announce the total as correctly as the tabulator with pencil and pad who stood beside him. Merchants employed him at inventory time instead of using adding machines. He would tell engineers how many bricks would be needed for a wall; compute cube root; reply an exact age the instant a birth date was given him. And, always to the question, "How do you do it?" he would answer, "I do not know."

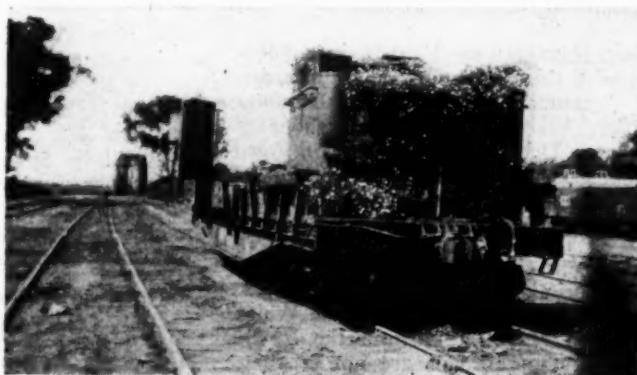
Track English

R. E. Thompson, writing in the New York Central Lines magazine, lauds the work done by the foreign section foremen on American railways. He gives, however, some amusing instances of the difficulties of the English language to such foremen, as follows:

We note that some time is spent daily for "Inspecting Trak," while a goodly portion is used for "Repairing Mane-Line" and quite a little for "Rodeway Maitanse." On one or two days he was "Petrochling Trak" (Patrolling), today perhaps on "Frait Traks," tomorrow on "Mane Line." The material used and released also seems to offer countless difficulties to the phonetic writer, for we observe that he used some $1\frac{1}{2}$ in. "nut lokes" and released similar ones, except that they were "crape." Next day he uses two "per" of 80-pound "25ing splis" (80-pound 25-inch splice), and a little later disposes of "25 punt salt" (25 pounds salt). On yet another day he is working on drains, and notes that he used "60 fet of 6ing suars tiles" (60-foot 6-inch sewer tile), and on being called out to "Repere switch" (he got the word switch all right) he used " $\frac{1}{2}$ Kig Trak spikis" while the ones released on that day were "crape."

A Mobile Garden

It has been truly said that the feminine touch is required for beauty and this is well demonstrated in the water car shown in the accompanying illustration. A water car is not in itself a



The Water-Car Flower Garden

thing of beauty, but Mrs. O. F. Burnett, wife of the bridge and building foreman of the McAlister district of the Missouri-Kansas-Texas, has changed all that. Now, as the water car goes from place to place, it is the object of admiration on the part of all beholders.

NEWS of the WEEK



Tunkhannock Viaduct on the Lackawanna Main Line.

LEONOR F. LOREE, president of the Delaware & Hudson, has been re-elected president of the Chamber of Commerce of the State of New York.

J. W. WILLIAMS has been appointed secretary of the Mississippi Railroad Commission, succeeding J. L. Gainey, resigned; headquarters Jackson, Miss.

THE SENATE on May 11 confirmed the President's appointment of Oscar B. Colquitt, of Texas, as a member of the United States Board of Mediation.

THE DENVER & RIO GRANDE WESTERN has increased the pay of its employees in the mechanical department, 2,500 in number, making an addition to the annual payroll of about \$220,000.

THE RAILROAD COMMISSION OF CALIFORNIA has authorized the elimination of 41 grade crossings in that state, the orders contemplating improvements which will cost \$4,250,000.

THE RAILWAY CLUB OF PITTSBURGH (Pa.) will hold its next meeting at Fort Pitt Hotel, Pittsburgh, on May 23. J. M. Nicholson, fuel conservation engineer of the Atchison, Topeka & Santa Fe, will read a paper on utilization of locomotives, illustrated by motion pictures.

THE NATIONAL OF MEXICO, in connection with the reorganization of mechanical department forces on the Durango division, has moved the repair shops at Durango, Dgo., to Aguascalientes, Ags., confining shop facilities at Durango to such running repairs as can be made in the enginehouse at that point.

ALFRED P. THOM, general counsel of the Association of Railway Executives, called on President Hoover at the White House on May 9 to inform the President that the railroads are not pressing for the passage or consideration of the railroad consolidation bill at this session of Congress, as had been reported in some quarters.

THE PACIFIC RAILWAY CLUB will hold its next meeting at Palace Hotel, San Francisco, on Thursday evening, May 23. The principal topic before the meeting will be progress in telephone and

telegraph communication, with motion pictures demonstrating television and addresses by Lee Kiborn, A. T. Lowry, and F. E. Redline.

THE DENVER & RIO GRANDE WESTERN was blocked for nearly two weeks by earth and rock slides in La Veta Pass, being opened to traffic on April 29. This is the standard gage line between Pueblo, Colo., and Alamosa. Melting snow and rains had loosened gravel, rock and earth, covering the track in a cut. While this section was out of service, trains were moved over the narrow-gage branch between Alamosa and Salida.

Wage Statistics for February

Class I railways reported to the Interstate Commerce Commission a total of 1,606,250 employees as of the middle of February, and a total compensation of \$223,061,510, as compared with the returns for the corresponding month of last year, the summary for February showing a decrease in the total number of employees of 2,121, or 0.13 per cent. The total compensation shows an increase of 0.56 per cent.

Buffalo Station to Be Opened on June 23

The New York Central announces that its magnificent new passenger station at Buffalo, N. Y., is now nearly completed, and will be opened for service on Sunday, June 23. On Saturday, the 22nd, there will be dedication ceremonies, the preparations for which are now being made by the officers of the railroad and of the city, in co-operation with the Buffalo Chamber of Commerce.

Baltimore & Ohio Magazine Correspondents

District correspondents of the Baltimore & Ohio Magazine, to the number of 130, held their annual conference in Baltimore, Md., last week, closing with an excursion to Philadelphia and Valley Forge. Following the general discussions, the correspondents listened to an address by President Daniel Willard. The Baltimore & Ohio Magazine now has a circulation of 58,600 copies.

The president of the Correspondents'

Association for the ensuing year is H. Irving Martin of Baltimore; secretary, Miss Mabel L. Menges, Baltimore.

New York State Crossings

According to a recent announcement by the New York Public Service Commission, there had been up until April 15, this year, 324 orders by the commission in proceedings to eliminate grade crossings in New York State, outside of greater New York. These involved 514 grade crossings.

There have been 60 projects completed, involving 82 grade crossings, and 56 projects to do away with 105 railway crossings are under construction. The estimated cost of the projects now under construction is \$5,204,625. At the time these figures were compiled, there were 12 more projects, involving 17 crossings, ready for letting of contract.

Cleveland Union Terminal

In the Federal Court at Cleveland, Ohio, on May 14, the Cleveland Union Terminal Company was enjoined from carrying on construction activities on Wheeling & Lake Erie premises in that city, pending a decision of the Interstate Commerce Commission concerning the proposed abandonment of that road's present station. The directors of the Wheeling & Lake Erie, on May 8, rescinded their votes of April 26, relative to the use of the new Union Terminal, which had been objected to by the Terminal Company officials. These votes included an amendment to the contract between the two companies increasing the rental to be paid to the Wheeling & Lake Erie by the Terminal for use of Wheeling property.

Advertising Posters of Foreign Railways

The Library of the Bureau of Railway Economics is holding its third annual exhibit of advertising posters of foreign railways. It will continue until May 31 and is being attended by many of the delegates to the several conventions now meeting in Washington, as well as railway men in and visiting the city. The exhibit includes 277 posters from such widely-separated countries as Argentine

Republic and Manchuria, Denmark and India, and represents the work of the best artists in each of the countries. American representatives of various foreign railroads—British, French, Canadian, German, Indian State, Netherlands, Norwegian, Swedish, South African, and Manchurian—co-operated in assembling the exhibit.

Appropriation Asked for Mail Pay

A supplemental estimate for an appropriation of \$39,000,000 for the Post-office Department to enable it to make payments to the railroads for the transportation of the mails under the Interstate Commerce Commission's decision which advanced the rates retroactively about three years to the date of the railroads' application for a re-examination, was transmitted to Congress on May 10 by President Hoover. Payments under the decision had been withheld pending a decision by the Supreme Court in a previous case involving the question of the commission's authority to make rates retroactive. The court sustained the commission's order. The amount of the retroactive payments to the roads was estimated at about \$45,000,000 but the department had available some unexpended funds.

Group Insurance

The Waterloo, Cedar Falls & Northern has concluded a contract with the Metropolitan Life Insurance Company, New York City, under which group insurance—life, health and accident, including non-occupational accident insurance—is provided for its employees, 200 or more in number. The aggregate amount of life insurance is about \$280,000 and the individual policies range from \$1000 to \$3000, with sick and accident benefits ranging from ten dollars a week to forty dollars.

This road is an electric line of 112 miles, operating ten locomotives. The head office is at Waterloo, Iowa, in which city there is one of the 4000 visiting nurse centers maintained by the Metropolitan Life Insurance Company. The facilities of this nurse service are placed at the disposal of sick or injured railway employees.

Contest Winners Picked

Samuel A. Hayden, chief clerk to general storekeeper of the Missouri-Kansas-Texas at Parsons, Kans., and A. G. Bohorfoush, chief stock clerk of the Southern Railway at Birmingham, Ala., were declared winners in a contest held during the year by the purchases and stores division of the A.R.A., for papers on the work and problems of the purchasing and stores departments of the railroads. This contest was the third annual contest held by the division and was open to all subordinate officers and employees in railway purchasing and stores work. There were about 35 papers entered in the contest this year. Mr. Hayden's paper is entitled "Improvement Is a Vital Necessity" and Mr. Bohorfoush's paper is entitled "A Standard Method of

Calculating Stock Turnover". The two authors will be sent to the annual purchases and stores convention in San Francisco June 24, 25 and 26, to read their papers.

Harvey to Operate Restaurant Facilities at Cleveland

Restaurants and shops in the new Cleveland (Ohio) Union Station will, when that station is completed in 1930, be operated by the Fred Harvey organization. To operate facilities at that station and at stations at Chicago, St. Louis, and Kansas City, a new company, Harvey, Inc., has been formed, with the same officers as Fred Harvey, Inc. Fred Harvey, Inc., will confine its operations to hotels, dining stations and dining cars on the Atchison, Topeka & Santa Fe and the St. Louis-San Francisco.

The facilities at Cleveland, which will represent the first entrance of the Harvey organization into territory east of Chicago, will occupy 175,000 sq. ft. of floor space. The restaurant, lunch room, coffee shop, cafeteria, sandwich shop and luncheonette service will accommodate between 9,000 and 10,000 persons. Merchandising facilities will include a drug store, a men's furnishings shop, a women's shop, a gift shop, a book shop, a toy shop, a flower shop, a fruit shop, a pastry shop and news stands, cigar shops, candy shops and barber and beauty shops.

Smoke Prevention

The Smoke Prevention Association held its twenty-third annual convention at Kansas City, Mo., on May 14 to 17. During the last three days of the meeting several railroad men addressed the convention. These included J. E. Bjorkholm, assistant superintendent of motive power of the Chicago, Milwaukee, St. Paul & Pacific, whose subject was "Black Smoke and its Prevention"; D. C. Buell of the Railway Educational Bureau at Omaha, Neb., whose subject was "Why Toss your Money out of the Smoke Stack"; Charles Longman, road foreman of engines of the Chicago & North Western, whose subject was "Diesel Locomotive Practice"; J. M. Nicholson, fuel conservation engineer of the Atchison, Topeka & Santa Fe, whose subject was "Proper Operation and Maintenance of Locomotives to Abate Smoke"; D. I. Bergin, assistant general road foreman of engines of the Wabash; John Irwin, chief smoke inspector of the Chicago & North Western, John H. Rewald, road foreman of engines of the Grand Trunk and L. G. Plant of the Railway Engineering Equipment Company.

Telephony from Moving Trains

The question why railroad trains in the United States are not equipped with telephones connected by radio with the wire telephone lines was raised in the Senate recently by Senator Dill, of Washington, who read a statement by Oswald F. Schuette, executive secretary of the Radio Protective Association who, referring to the recent announcement of

such installations on the Canadian National, said that such installations on trains in the United States had been prevented by the "radio trust agreements" by which, he said, the Radio Corporation, the General Electric Company and the Westinghouse Electric & Manufacturing Company "have agreed to do nothing in the field of wireless telephony that might compete with the wire lines of the American Telephone & Telegraph Company."

Walter S. Gifford, president of the A.T. & T. company, issued a statement saying that for some years that company has been ready to install telephone service on moving trains but that two of the leading railroad systems had decided against it as it was not considered commercially practicable. "If any railroad wishes to give such service on its trains and bear the necessary cost of it," he said, "we shall be very happy to install it and connect it with the lines of the Bell System."

The C.P.R. in March

Operating net of the Canadian Pacific for March amounted to \$3,956,275, as against \$3,633,206 in March of last year, an increase of \$323,068. Gross earnings showed an increase of \$731,084, while operating expenses were \$408,015 higher.

For the first quarter of the year, operating net amounted to \$7,643,579, as compared with \$8,114,301 in the corresponding three-month period of last year, a decrease of \$470,721. For the three-month period gross earnings were higher by \$761,641, while operating expenses increased by \$1,232,362.

The following table shows the earnings, expenses and net profits for the month of March with comparisons:

	MARCH.		Inc. \$
	1928 \$	1927 \$	
Gross	17,538,585	16,807,501	731,084
Exp.	13,582,309	13,174,294	408,015
Net	3,956,275	3,633,206	323,068
THREE MONTHS ENDING			
	Feb., '29 \$	Feb., '28 \$	Inc. \$
Gross	47,862,429	47,100,788	761,641
Exp.	40,218,849	38,986,487	1,232,362
Net	7,643,579	8,114,301	*470,721

* Decrease.

Commercial Stocks of Coal, April 1

Consumers' stocks of bituminous coal on April 1, 1929, amounted to 36,000,000 tons, according to a survey by the Bureau of Mines. In comparison with the 41,800,000 tons in storage on January 1, the date of the last survey, this is a decrease of 5,800,000 tons. Production during this period declined while consumption for the major classes of consumers increased. As a result stocks are back to the level of May, 1926, and the exceptionally heavy reserves built up in anticipation of the suspension of 1927 are now liquidated.

Colder weather combined with a somewhat quickened tone of general business caused consumption in the first quarter of 1929 to increase by 887,000 tons a week. The average weekly consumption during the three months ended March 31, was 11,483,000 tons. Exports averaged 224,000

May 18, 1929

tons, and the total consumption plus exports was 11,662,000 tons a week. In comparison with the corresponding period of 1928, the rate of consumption shows an increase of 7 per cent.

According to the American Railway Association stocks of railroad coal on April 1 amounted to 8,192,000 tons. This is the smallest quantity held by the railroads since May 15, 1923 and represents a net reduction of 1,045,000 tons since the beginning of the year. The stocks on comparable dates in other recent years are shown below.

April 1, 1921	9,700,000
April 1, 1922	19,844,000
April 1, 1923	7,385,000
April 1, 1924	18,722,000
April 1, 1925	11,147,000
April 1, 1926	9,090,000
April 1, 1927	22,806,000
April 1, 1928	14,486,000
Jan. 1, 1929	9,237,000
April 1, 1929	8,192,000

At the rate of consumption prevailing in the first quarter of the year the stocks on April 1 were sufficient to last 23 days. By railroad regions, the supplies were as follows: New England, 39 days; Great Lakes, 24 days; Central Eastern, 16 days; Pocahontas, 12 days; Southern, 15 days; Northwestern, 42 days; Central Western, 22 days; and Southwestern, 7 days.

Location Selected for Cincinnati Union Station

Three ordinances seeking approval of the details of the proposed Union passenger terminal at Cincinnati, Ohio, to be constructed by the Cincinnati Union Terminal Company were introduced into the Cincinnati City Council on May 8 and referred by that body to the City Planning Commission. The ordinances, which explain in detail the various items of construction in the project, locate the station building on the edge of the Mill Creek bottoms, opposite Lincoln park and between Kenner and Hopkins streets.

In front of the station, between that building and Lincoln park, it is planned to locate a plaza, "President square," with approaches extending on a light grade to McLean avenue which forms the east line of the station. The building and its street approaches will occupy an area of approximately two city blocks.

The plans provide for 14 station tracks, with provision for the construction of eight additional at some future date. All tracks and other facilities will be placed above the highest recorded flood-water elevation, requiring approximately 6,000 cu. yd. of fill.

The project includes a mail building to be built by the Government, an express building to be built by Railway Express Agency, a 36-stall roundhouse, a machine shop, a store house, a coach yard service building and a coaling station. The Terminal company will also construct a new freight classification yard for the Southern, rearrange the Brighton yard of the Cleveland, Cincinnati, Chicago & St. Louis and relocate the main tracks of the Chesapeake & Ohio. New tracks to be laid will total about 85 miles. The Terminal company, in conjunction with the city, will construct a number of street viaducts over the terminal tracks.

Program for Freight Claim Convention

More than 400 reservations have already been made on a special section of the Capitol Limited of the Baltimore & Ohio, from Chicago on May 19 at 1:30 p.m. for the thirty-eighth annual session of the Freight Claim Division of the American Railway Association, to be held at Washington, D. C. The meeting will be held on May 21, 22, 23 and 24. The program is as follows:

TUESDAY MORNING, MAY 21

Welcome—Hon. Sidney F. Taliaferro, district commissioner
Address—R. H. Aishton, president, American Railway Association
Address—H. T. Lively, chairman, Freight Claim division
Report of general committee
Report of secretary

TUESDAY AFTERNOON

Report of Committee on Freight Claim Prevention; outstanding prevention activities of freight claim conferences during 1928
Survey made by Eastern and Chicago Claim Conferences during the months of January, February and March, 1929, on citrus shipments from all territories. Discussion led by W. S. Jensen, Merchants Despatch, and A. J. Lorion, engineer, Freight Container Bureau

WEDNESDAY MORNING

Address—Hon. Robert P. Lamont, secretary of commerce
Report of Committee on loss and damage rules
Address—J. H. Butler, Railway Express Agency

WEDNESDAY AFTERNOON

Address—H. C. Palmer, of the Traffic World
Report of committee on loss and damage rules (continued)

Address—J. E. Long, chairman, railroad section, National Safety Council

THURSDAY MORNING

Address—M. J. Gormley, Car Service division, A. R. A.
Election of loss and damage arbitration committees and overcharge arbitration committee
Report of committee on loss and damage rules (continued)
Joint Report of committee on loss and damage rules and committee on overcharge rules

Address—W. C. Kirby

THURSDAY AFTERNOON

Address—Edward Dahill, chief engineer, Freight Container Bureau
Report of Committee on Overcharge Rules

FRIDAY MORNING

Address—W. P. Bartels, director, bureau of service, Interstate Commerce Commission
Report of Committee on rules of order (continued)

FRIDAY AFTERNOON

Report of Committee on Rules of Order.
Adoption as a whole, of reports as amended.

Safety Program For June

L. G. Bentley, chairman of the Committee on Education, of the Safety Section, A. R. A., proposes to railroad safety

committees, no particular section of the records as a program for the month of June, but recommends a study of the whole of the records for the past five years. Safety committees are now in the sixth year of the program, first laid out in 1923, to secure an improvement of 35 per cent in safety by the end of 1930. In 1928 alone, the number of persons killed in railway accidents was 874 less than in 1923, and the number injured was 86,151 less.

Safety superintendents are exhorted to get the facts of these records into the minds and hearts of as many of their friends, acquaintances and other persons as possible; the great improvement which has been made should be woven into business papers and in fact into every public activity that the safety specialist finds himself connected with.

Employees are reminded that railway executives now deem it necessary that every poor safety record shall be accounted for; while the executives are told that the rank and file of employees, and especially the leaders of the railway labor organizations, are now imbued with a fixed determination to support the safety departments.

As the end of the seven-year program is approached, the accomplishment of further improvement will be more difficult; which means, of course, that efforts must be intensified.

Prospectus of Harvard Summer Courses Published

A recent issue of the Official Register of Harvard University outlines the scope of the 1929 summer session for business executives to be conducted at the university's Graduate School of Business Administration. As was announced in the *Railway Age* of February 2, page 334, the courses in railway transportation, given by Professor William J. Cunningham of Harvard and Professor Winthrop M. Daniels of Yale, are again to be included.

These summer sessions were inaugurated as an experiment last year and are now to be continued in response to a demand from business men. In the 1928 transportation courses 27 railroad men, representing nine roads, were enrolled. The sessions will extend over the six weeks from July 1 to August 10. The tuition fee will be \$200, the same as last year, with room and board charges ranging from \$125 to \$225 for those who elect to live in the school dormitories. Applications for admission should be addressed to Miss M. B. Fox, secretary of the special session, Harvard Graduate School of Business Administration, Soldiers Field, Boston, Mass. Of the \$200 tuition fee, \$25 is payable upon application, while remaining charges are payable upon registration at the opening of the session.

The object and scope of the railway courses are summarized in the announcement as follows:

Intended for: (1) junior officers and various operating and departmental heads of the railroad companies; (2) teachers of business. The course will be divided into two parts (1) economics and (2) administration, running concurrently. Part 1, railway economics, will treat in general, of railway rates and governmental

Your Contribution to Humanity

ACCIDENTS TO RAILWAY EMPLOYEES ON DUTY 1923 - 1928	
YEAR	DEATHS CAUSED BY RAILROAD ACCIDENTS
1923	153900
1924	126134
1925	120158
1926	112848
1927	89058
1928	70935

REDUCTION OF 250,367 EMPLOYEES INJURED SINCE 1923

Safety Pays

REPRINTED BY CONCERN FOR BUSINESS
SAFETY SERVICE, HARVARD GRADUATE SCHOOL

regulation. This part of the course will be organized around the following topics: industrial expansion through the promotion of regional specialization in production; the general principles underlying the making of railroad rates, involving an analysis of costs as affected by variations in traffic volume; the characteristic rate structures in the different rate territories; the origin and growth of regulation by commissions; the framework of Federal regulatory legislation culminating in the Transportation Act of 1920; the Interstate Commerce Commission's processes of valuation for rate-making, capitalization and recapture; the problem of railroad consolidation; and the financial structure of railroad corporations, together with an analysis of the Interstate Commerce Commission's functions and procedure.

On the administrative side, Part 2, attention will first be given to the fundamental principles of organization, illustrated by typical organization charts, and a discussion of interdepartmental relationships. The administrative aspects of maintenance of way, structures and equipment will be considered. Special emphasis will be placed upon the problems of the transportation department in the design and operation of yards, terminals and trains. Under each departmental heading attention will be paid to problems of personnel. Following a brief reference to the principles of railroad accounting, there will be a more extended discussion of the technique of statistical control.

The object of the course is to present the broad economic and administrative problems of the railroads not ordinarily falling within the experience of the specialized duties of the department head or junior executive.

Hearing on Proposed Chicago Electrification

At the third hearing before a subcommittee of the Illinois House of Representatives, at Chicago on May 13, on the Gaines Bill to require electrification of all railroads in Chicago, Jesse J. Siegfried, road foreman of engines on the Chicago & Alton, declared that the railroads were responsible for only from eight to ten per cent of the smoke nuisance in that city. Mr. Siegfried based his estimate on 23 years' experience, and upon a comparison with smoke conditions in St. Louis. His testimony tended to refute statements made by city officials that the proportion of smoke chargeable to the railways had not changed since the last city survey, made some 15 years ago, when it was found that 43 per cent of the smoke was caused by the railroads. Mr. Siegfried said the reduction in railroad smoke had been largely brought about, since 1923, by the use of city instead of river water and by the installation on locomotives of various improved devices. The Alton and other railroads had done everything asked by the city in the way of eliminating smoke.

In the course of the hearing it was shown that of the 10,018 violations of the smoke ordinance in 1925, only 738

were chargeable to railroads. In a statement on the practicability of substituting oil-electric for steam locomotives, F. C. Kultchar of the Ingersoll-Rand Company declared that the Chicago railroads were as keen to develop a substitute for steam power as were railroads in any other part of the United States. At the present time it would be impossible to perform all the switching service in Chicago with Diesel engines of 800 h.p. which are now the largest made in this country; though in the near future it may be possible to procure Diesel locomotives of 3000 h.p.

In the State Senate at Springfield on May 14, an amendment was proposed to the Woods electrification bill which would require Chicago railroads to use for electrification all moneys received from the sale of air rights. Senator Roy C. Woods, sponsor of the bill, believed that the total value of air rights over railroads in Chicago, which he declared to be a billion dollars, would exactly pay for the cost of the needed electrification.

The Fuel Supply Association Has Large Exhibit—New Officers Elected

At a regular meeting of the International Railway Supply Men's Association held in connection with the annual convention of the International Railway Fuel Association at the Hotel Sherman, Chicago, May 7 to 10 inclusive, the following were elected officers of the supply association for the ensuing year: President, C. O. Jenista, Barco Manufacturing Company, Chicago; vice-president, S. A. Witt, Detroit Lubricator Company, Chicago; secretary, L. R. Pyle Locomotive Firebox Company, Chicago; treasurer, C. M. Hoffman, Dearborn Chemical Company, Chicago. Members of the executive committee were elected as follows: C. H. Gaskill, Baldwin Locomotive Works, Chicago, for one year; J. W. Hulson, Hulson Grate Company, Keokuk, Iowa, for three years; F. C. Davern, Nathan Manufacturing Company, New York, for three years; and C. P. Rohow, National Refining Company, Chicago, for three years.

The exhibition held in connection with the convention exceeded somewhat in number and variety of products displayed the exhibition held in 1928, a total

of 72 railway supply companies being represented this year as compared with 65 last year. The following is a list of the companies exhibiting, products on display and representatives in attendance:

Alemite Manufacturing Corporation, Chicago.—Pressure appliances for locomotive lubrication. Represented by C. A. Fine, N. J. Kamen and J. H. Karow.

American Arch Company, New York.—Locomotive arch arrangement. Represented by G. M. Bean, T. M. Ferguson, W. Haag, T. Mahar, J. P. Neff, M. R. Smith and A. M. Sucese.

American Locomotive Company, New York.—Three-cylinder locomotive model; reverse-gear bell ringer; steam-pipe casing; outside-bearing engine trucks. Represented by C. M. Bell, Robert Brown, Arthur Haller, Hunter Michaels, W. S. Morris and N. C. Naylor.

American Steel Foundries, Chicago.—Cast-steel locomotive grates. Represented by C. V. Broadway, W. G. Wallace and W. C. Walsh.

American Throttle Company, New York.—Locomotive throttle. Represented by E. A. Averill, H. C. Bell, Bard Browne, W. A. Buckbee, C. H. David, E. J. Drewyur, G. Fogg, W. B. Grove, A. C. McLachlen, R. M. Osterman, R. R. Porterfield and G. E. Ryder.

Argyle Railway Supply Company, Chicago.—Caboose and station stoves. Represented by B. B. Shaw and A. H. Green.

Badeker Manufacturing Company, Chicago.—Metallic packing for locomotive piston rods and valve stems. Represented by B. R. Alley, W. H. Bentley, E. V. Lea, Edward O'Malley, Edward O'Malley, Jr., and A. J. Sams.

Baldwin Locomotive Works, Philadelphia, Pa.—Locomotive photographs. Represented by Henry Blanchard, Walker Evans, C. H. Gaskill and Charles Riddell.

Barco Manufacturing Company, Chicago.—Automatic smoke-box blower fitting; engine and tender metallic connections for air, steam, oil and water; metallic steam-heat connections; lubricated plug valves; reservoir joints; power reverse gears. Represented by F. N. Bard, W. J. Behlike, Jr., C. O. Jenista, A. S. Lewis and C. L. Mellor.

Bethlehem Steel Company, Bethlehem, Pa.—Model of Bethlehem auxiliary locomotive. Represented by G. W. Armstrong, R. S. Folk, C. M. Jordan, I. C. Jordan and R. J. McCarty, Jr.

Bird-Archer Company, The, Chicago.—Boiler water-treatment, chemicals and boiler blow-off cock equipment. Represented by J. L. Callahan, J. J. Clifford, S. P. Foster, H. C. Harrigan, C. Hutton, P. G. Jones, H. L. Mauer, C. J. McGurn, T. A. Peacock, F. K. Tutt, R. A. Wilsey and L. F. Wilson.

Bradford Corporation, Chicago.—Throttles, front-end, back-head connected and side dome-connected types. Represented by E. J. Barnett, A. C. Bodeau and J. C. Keene.

Brake Equipment & Supply Company, Chicago.—Standard air-brake repair parts; reconditioned triple-valve pistons; lapping plates; gages, etc. Represented by J. R. McClintock, B. Pratt, J. F. Pratt and C. J. Smith.

Burnside Steel Foundry Company, Chicago.—Locomotive firing tools; locomotive crank arm; side bearings; sill step and safety appliances. The foregoing are made of electric alloy steel. Represented by W. H. Moore.

Clark Manufacturing Company, Philadelphia, Pa.—Smith piston parter, frame-bolt jack and bridge jack. Represented by H. J. Smith.

J. S. Coffin, Jr., Company, The, Englewood, N. J.—Feedwater heater system. Represented by W. T. Comley, C. S. Edgerle, R. P. Peckett, Jr., C. W. Wheeler and Paul Willis.

Consolidated Ashcroft Hancock Company, Inc., New York.—Inspirators; boiler check and safety valves; water columns; hose strainer; oil cups; cut-off control, air and steam gages; hydraulographs and dead-weight testers. Represented by C. L. Brown, J. H. Bush, C. W. Corning, J. S. Smith and J. P. Walsh.

Corley-DeWolfe Company, Elizabeth, N. J.—Ground-joint unions, elbows, and reservoirs. Represented by R. A. Corley.

Cut-off & Speed Recorder Corp., The, New York.—Locomotive valve pilot; locomotive and switch-engine recorders. Represented by E. D. Caldwell, C. F. Pennypacker, R. B. Steward and F. D. Welden.

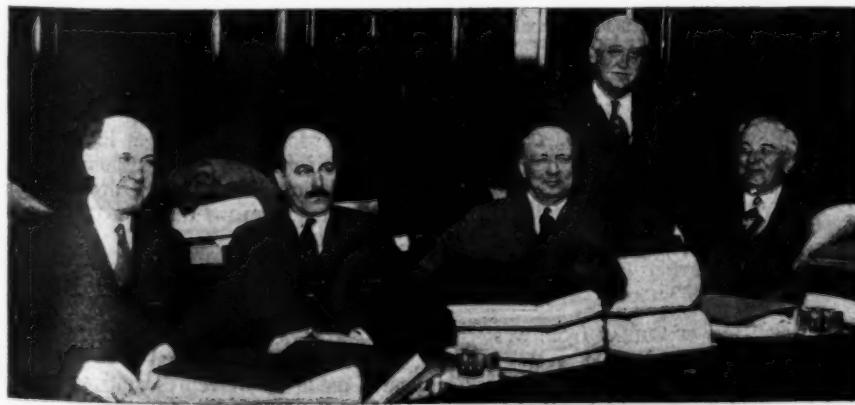
Dearborn Chemical Company, Chicago.—Treating plants; water treatment; rust preventative. Represented by C. E. Baty, I. H. Bowen, L. P. Bowen, L. D. Brown, G. R. Carr, R. F. Carr, H. Cameron, H. B. Crocker, R. A. Dalton, N. F. Dunn, C. M. Hoffman, F. B. Horstmann, R. Q. Milnes and S. E. Moore.

Detroit Lubricator Company, Detroit, Mich.—Force-feed oiler; pendulum flange oiler; hydrostatic lubricators. Represented by C. C. King, E. F. Milbank, C. E. Sperry and S. A. Witt.

Dickinson, Inc., Paul, Chicago.—Cast-iron stove jacks for camp cars and cabooses; steam exhaust heads and ventilators for roundhouses. Represented by A. Engman and A. J. Filkins.

Duff-Norton Manufacturing Company, The, Pittsburgh, Pa.—Air, high-speed and journal jacks. Represented by T. A. McGinley, C. N. Thulin and E. E. Thulin.

Dunphy Dickinson Supply Company, Chicago.—Electric blowers; paint sprayers. Rep-



Railway Officers at Hearing on Proposed Electrification

Those in the picture are, left to right: W. D. Beck, district manager, Car Service Division, A.R.A.; George W. Hand, assistant to president, Chicago & North Western; Samuel H. Cady, general solicitor, Chicago & North Western; John L. Flannigan, railroad representative at Springfield, Ill.; C. S. Jefferson, general attorney, Chicago, Milwaukee, St. Paul & Pacific.

resented by C. A. Duntley and W. J. Dickinson. Durametallic Corporation, Kalamazoo, Mich.—Packing for throttles, air pumps, reverse gears, valve rods, cab cocks, ball joints, front-end steam pipes and general power-plant use. Represented by J. M. Bandish, C. C. Hall, Herbert Lewis and J. J. McQuillen.

Edna Brass Manufacturing Company, The, Cincinnati, Ohio.—Mechanical lubricators; automatic oilers; fire extinguishers; boiler checks; coal sprinklers; air manifold; rigid water gage; gage cocks; oil burners; water columns; cylinder cocks. Represented by Wm. Beck, E. O. Corey and F. S. Wilcoxen.

Estate Stove Company, Hamilton, Ohio.—Station and caboose stoves. Represented by W. P. Whitfield.

Garlock Packing Company, Palmyra, N. Y.—Asbestos cups; cab-cock packing; rings for water heaters; air-pump and throttle packing; insulating tape. Represented by H. J. Ramshaw and J. F. Franey.

George Manufacturing Company, Philadelphia, Pa.—Automatic drain valves; automatic drain and relief valves. Represented by R. H. George. Gilg, Henry F., Pittsburgh, Pa.—Hollow stays for locomotive boilers; valve for gases and liquids. Represented by H. F. Gilg.

Gold Car Heating and Lighting Company, Brooklyn, N. Y.—Pressure regulators; end train-line, supply and vapor valves; steam-hose coupler positive lock; Finn pipe for car heating. Represented by R. L. Belknap and A. D. Stover.

Goodall Rubber Company, Philadelphia, Pa.—Semi-metallic squirt, air, wash-out, and steam hose; lip gaskets. Represented by C. L. Butler.

Graham-White Sander Corporation, Roanoke, Va.—Locomotive sanders and spreaders. Represented by F. J. Kearney, G. S. Turner and W. H. White.

Hulson Grate Company, Keokuk, Iowa.—Locomotive tuyere-type grate model. Represented by E. E. Bergman, H. N. Gardner, A. W. Hulson and J. W. Hulson.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder bushings; cylinder packing; piston heads; crosshead shoes; air-pump bushings; sectional packing. Represented by V. W. Ellet, E. J. Fuller, C. L. Galloway, D. F. Hall, F. B. Hartman, F. W. Lampton and J. G. Platt.

Hyatt Roller Bearing Company, Chicago.—Railroad journal bearings and boxes. Represented by J. B. Ball, G. A. Buckbee and R. F. Wilson.

International Correspondence Schools, Scranton, Pa.—Educational lessons, charts and models. Represented by F. S. Powell and E. M. Sawyer.

Johns-Manville Corporation, New York.—High-temperature cements; metallic packing; boiler lagging; wool insulating products; asbestos lumber; insulating tape; asbestos cements.

Represented by P. R. Austin, C. S. Clingman, H. Grece, J. O'Leary, Jr., A. C. Pickett, H. R. Poulsom, R. C. Simmons and J. C. Younglove.

Lima Locomotive Works, Inc., New York.—Pictures of Lima superpower steam locomotives. Represented by Walter Carnes, J. E. Long, A. C. Steinmetz, M. K. Tate and W. H. Winterrowd.

Locomotive Finished Material Company, Atchison, Kan.—Sectional cylinder packing rings; bull rings; floating-bushing driving box; floating-bushing engine-truck box; blow-off muffler. Represented by Clive Hastings and R. L. McIntosh.

Locomotive Firebox Company, Chicago.—Thermic siphon. Represented by J. Baker, G. R. Carr, R. E. Carr, W. S. Carr, L. R. Pyle, E. J. Reardon, C. M. Rogers, C. A. Soley and A. A. Taylor.

Lunkenheimer Company, The, Cincinnati, Ohio.—Valves and other engineering appliances. Represented by H. J. Evans and Karl Litzelman.

MacLean-Fogg Lock Nut Company, Chicago.—Lock nuts; speed nuts. Represented by J. W. Fogg and J. A. MacLean.

W. H. Miner, Inc., Chicago.—Friction draft gears; safety hand brake; rolling-rocker side bearings. Represented by B. S. Johnson and S. T. Mendez.

Nathan Manufacturing Company, New York.—Injectors; low-water alarms; hydrostatic and force-feed lubricators; atomizers; all brass work. Represented by F. Bavern, Fred Ehredt, J. A. Kelly and Richard Walsh.

National Railway Devices Company, Chicago.—Radial firebox door. Represented by Steve Ord.

Ohio Injector Company, Chicago.—Low-water alarm; fire jet; boiler check; water-glass protector; mechanical and hydrostatic lubricators; flange and rail oilers; non-lifting injectors; transfer filler; multiple container. Represented by A. C. Beckwith and C. G. Sauerberg.

Okadec Company, Chicago.—Front-end hinge; automatic cylinder cocks; tender hose couplers; automatic drain; blow-off and blower valves; cylinder safety valves; water glass protectors and lights; blow-off mufflers. Represented by G. P. Dirth, W. H. Heckman, A. G. Hollingshead, J. M. Monroe and C. W. Ploen.

Paxton-Mitchell Company, Omaha, Neb.—Metallic packing for piston rods, valve stems and air pumps. Represented by J. J. Keliher, L. J. McConnell, H. J. Molloy and J. L. Paxton.

Permutit Company, New York.—Water softeners; clarifying filters and mechanical CO₂ recorders. Represented by I. J. Bready, J. R. Crocker, F. S. Dunham, R. S. Ellis and H. P. Sherwood.

Pilliod Company, New York.—Locomotive cutoff control; valve gear. Represented by W. H. Bellmaine, J. H. Cooper, Frank Fisher, H. G. Pilliod and R. H. Weatherly.

Pilot Packing Company, Chicago.—Packing; drifting valve; insulating tape. Represented by J. Sinkler and R. N. Sinkler.

Pittsburgh Coal Company, Pittsburgh, Pa.—Mechanically cleaned coal and coal-cleaning process. Represented by C. W. Keatley, W. P. Poindexter, T. H. Queer, C. A. Reed and W. L. Sheppard.

Pyle-National Company, Chicago.—Turbo generators; locomotive headlights; floodlights; cab, marker and classification lamps; locomotive and automatic train-control fittings; car and yard charging plugs and receptacles; train-line receptacles and connectors; vapor-proof lighting fixtures; safety hand lamps; safety switches; screw-cover conduit fittings; gas-engine generator drive; duplex distribution valve. Represented by J. A. Amos, J. V. Baker, C. W. Dahe, Wm. East, G. E. Haas, Walter Jansen, J. W. Johnson, J. J. Kennedy, William Miller, W. A. Ross and Walter Smith.

Railway Journal, Chicago.—Railway publication. Represented by Walter Bentley, E. C. Cook, S. Rosenthal and J. A. Williams.

Railway Purchases & Stores, Chicago.—Railway publication. Represented by Edward Wray.

Roberts & Schaefer Company, Chicago.—Side-cut, non-skim coaling gate and apron; spiral lowering chute. Represented by C. P. Ross and D. E. White.

Sargent Company, Chicago.—Water columns; three-face, steam, and duplex pressure gages; iron-clad protectors; water-glass fittings; blower and packless radiator valves; two-seat gage cocks. Represented by L. L. Schultz.

Wm. Sellers & Co., Inc., Philadelphia, Pa.—Exhaust feedwater heater; non-lifting injectors and equipment; starting valves; steel-bronze coupling nuts; safety squirt and rail washer; boiler checks. Represented by J. R. New and P. E. Raymond.

Simmons-Boardman Publishing Company, New York.—Railway Age and Railway Mechanical Engineer. Represented by P. D. Jurascheck, M. B. Richardson and E. L. Woodward.

Spring Packing Corporation, Chicago.—Journal-box packing. Represented by W. H. Davis, W. M. Gibbs, J. S. Hearons, J. D. Herr, J. P. Landreth and L. A. Rowe.

Standard Stoker Company, Inc., Chicago.—B. K. stoker, coal pusher. Represented by G. A. Edwards, C. T. Hansen, H. S. Mann, G. M. Myers, F. P. Roesch, E. T. Schroeder and A. L. Whipple.

Steam Coal Buyer, St. Louis, Mo.—Magazines. Represented by J. A. Harris.

Superheater Company, The, New York.—Exhaust-steam injector; boiler feed pump. Represented by E. A. Averill, H. C. Bell, Bard Browne, W. A. Buckbee, C. H. David, E. J. Dreyour, G. Fogg, W. B. Grove, A. C. McLachlen, R. M. Osterman, R. R. Porterfield and G. E. Ryder.

Swanson Company, Chicago.—Locomotive gage holders. Represented by O. W. Swanson.

T-Z Railway Equipment Company, Chicago.—Automatic drain valves; boiler washout and arch-tube plugs; front-end blower nozzles; blow-off valve safety locking device. Represented by F. J. Kearney, G. S. Turner and F. G. Zimmerman.

The Texas Company, Chicago.—Equipment lubricants. Represented by F. S. Freeman, J. L. Lavallee, E. Wegner and J. H. Wood.

Transportation Publishing Company, Inc., Los Angeles, Cal.—Railway Publication. Represented by Robert Mertz.

Vapor Car Heating Company, Inc., Chicago.—Thermostatic controlled car heating system; flexible metallic steam conduits; steam-hose couplers; steam-heat pressure-regulating and stop valves; fin type radiating pipes, etc. Represented by L. H. Gillick, E. C. Post and E. E. Smith.

Viloco Railway Equipment Company, Chicago.—Sanders; bell ringers; pneumatic whistle operator; automatic rail washer; locomotive exhaust pipe; grease lubricator. Represented by G. P. Dirth, W. H. Heckman, A. G. Hollingshead, J. M. Monroe and C. W. Ploen.

Whiting Company, Harvey, Ill.—Literature. Represented by H. K. Christie.

Woodruff Swing Joint Company, Chicago.—Metallic steam connectors for passenger cars; siphon jet car-cleaning systems. Represented by L. N. Callahan and L. D. Woodruff.

Worthington Pump & Machinery Corporation, New York.—Open type locomotive feedwater heater. Represented by G. B. Bourne, J. E. Buckingham, D. R. Coleman, D. Ellis, R. J. Kelley, J. M. Lammedee, T. C. McBride and J. A. Wilson.

THE MOVEMENT OF WHEAT from western Kansas and the Panhandle section of Oklahoma and Texas, this year, is expected to establish a record for that territory. About 90 per cent of the crop will be harvested with from 22,000 to 25,000 combines, as compared with 70 per cent with 19,700 combines last year.

Traffic

The Public Utility Commissioners of New Jersey have approved the application of the West Jersey & Seashore for authority to discontinue the agencies at Pomona and at Elwood; but have denied a similar petition relative to South Seaville.

The Hudson River Day line and the Hudson River Navigation Corporation, which latter operates the night boats on the Hudson river, have joined in the purchase of the Central Hudson Steamboat Company, a line which does freight business between New York City and places along the middle section of the Hudson river. This purchase will give the two older lines virtual control of the long distance freight and passenger traffic on the river between New York and Albany. The Catskill Evening line has recently been acquired by the Day line.

Additional passengers carried in and out of the new North Station, Boston, by the Boston & Maine road as a result of sporting and other events in the "Boston Garden" since its opening in November number to date 171,865. Special trains have been run on 47 days when popular Garden events were held. The totals of Garden patrons carried in and out in all trains were: Hockey games, 82,742; boxing, 34,188; circus, 34,140; Gipsy Smith revivals, 20,795. Because of the location of the Boston Garden above the new station, the operation of special trains, and the establishment of special evening rates have combined to attract new riders. But in spite of the added riders gained a serious net loss in passenger traffic is continuing at nearly the same rate as last year, when this road carried 2,600,000 fewer passengers than in 1927.

Hoch-Smith Case to be Re-Argued Before Supreme Court

The Supreme Court of the United States on May 13 ordered a re-argument next October of the California deciduous fruit rate case, in which the railroads are contesting the validity of the Interstate Commerce Commission's interpretation of the Hoch-Smith resolution. The commission ordered a reduction in the rates from California to eastern points under the resolution, after having decided only a year or so before that the rates were not unreasonable.

National Transportation Board Proposed

Creation of a national transportation board, made up of representatives of various agencies of the government interested in the several phases of transportation by air, rail, water and highway, "in order that studies of fact may be expedited in the interest of the traveling

and shipping public", was advocated by a group of leading executives in the automobile industry who called on President Hoover at the White House on May 2. They also called on several members of the Cabinet for the purpose of discussing means of expanding motor transportation facilities both here and abroad.

Canada Feels the Mexican Revolution

When the price of tomatoes advanced suddenly and materially about the first of March, housekeepers may have been inclined to doubt the explanation that the higher price was due to the Mexican Revolution. Yet, says the Atlantic Coast Line bulletin, that happened to be the fact. In recent years sections of Western Mexico have been producing large quantities of early tomatoes for the markets of this country and even of Canada, and this supply has been an important factor in fixing the price as far away as New York, Boston and Montreal. The provinces of Mexico in which the tomatoes are grown were occupied by the revolutionists, who blew up railroad bridges and tracks, and successfully demoralized rail transportation. The cutting off of the Mexican supply resulted in the increase in price. Growers in Florida benefited by this increase, which also served to stimulate shipments of tomatoes from Cuba.

Freight Traffic in March

Freight traffic moved by the Class I railroads in March amounted to 40,212,666,000 net ton-miles, according to reports compiled by the Bureau of Railway Economics. This exceeded by 726,610,000 net ton-miles, or 1.8 per cent, the total in March last year, but was a reduction of 3.8 per cent under that for March, 1927.

In the Eastern district, there was an increase of 5.5 per cent, compared with the same month in 1928, while the Southern district reported a decrease of 5.6 per cent. The Western district reported a decrease of one-tenth of one per cent.

Traffic for the first three months amounted to 117,540,335,000 net ton-miles, an increase of 5.4 per cent above that of the corresponding period in 1928. It was, however, a decrease of six-tenths of one per cent under that of the same period in 1927. Railroads in the Eastern district for the three months reported an increase of 9.1 per cent, while the Southern district reported a decrease of seven-tenths of one per cent. The Western district reported an increase of 2.9 per cent.

The average daily movement per freight car for March was 32.3 miles, which was an increase of 1.4 miles over the average for same month last year and an increase of 1.4 miles over March, 1927.

The average speed of freight trains was 13 miles an hour, an increase of 0.2 mile above March last year and an increase of 0.8 mile above March, 1927.

The average load per car in March this year was 25.8 tons. This was a decrease of 0.3 ton under the average for March, 1928, and a decrease of 1.6 tons under March, 1927.

Equipment and Supplies

Locomotives

THE CALUMET & HECLA CONSOLIDATED COPPER COMPANY is inquiring for one 2-6-0 type locomotive.

THE HUMBLE OIL & REFINING COMPANY is inquiring for one 50-ton switching locomotive.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered four locomotives of the 4-6-4 type from the Lima Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of April 6.

THE CHILEAN STATE RAILWAYS will receive bids at Santiago, Chile, until July 5 for 12 locomotives of the 4-8-2 type. Plans and specifications are on file at the New York office of the railway, 225 Broadway.

THE CANADIAN PACIFIC has authorized the construction at its Angus shops of a double-pressure steam locomotive. In the design and construction of this locomotive the railway company will have the co-operation of the Montreal Locomotive Works and the Superheater Company. The indirect method of steam generation will be used in the high-pressure portion of the boiler, in which a working pressure of 900 lb. will be carried. The low-pressure portion will carry a pressure of 250 lb. High-pressure steam will be used in one cylinder, and the exhaust from this cylinder, combined with steam from the low-pressure section of the boiler, will supply the two low-pressure cylinders. Steam from both sections of the boiler will be superheated and the locomotive will be equipped with a closed type feed-water heater. A fuel economy of at least 20 per cent, as compared with present modern locomotive types, is anticipated.

THE NEW YORK CENTRAL is having a high-pressure, double-pressure experimental steam locomotive built in co-operation with the Superheater Company and the American Locomotive Company at the latter's Schenectady works. In weight and tractive force the new locomotive will roughly approximate the heavy freight locomotives now in service on that road. Steam will be generated in the high-pressure section of the boiler at a pressure between 800 and 900 lbs., and in the low-pressure section of the boiler at a pressure above 200 lb. The high-pressure steam will be generated indirectly by the transfer of heat from a closed system of water tubes around the sides and top of the firebox, operating at a pressure between 1,300 and 1,400 lb. Steam from both sections of the boiler will be superheated. The locomotive will be a three-cylindered compound, steam from the low-pressure section of the boiler being mixed with the exhaust from the high-pressure cylinder to supply the low-pressure cylinders. About 60 per cent of the steam will be produced in the high-

pressure portion of the boiler. A fuel saving of 20 per cent as compared with present modern locomotive types is anticipated.

Freight Cars

THE PENNSYLVANIA is inquiring for 50 all-steel caboose cars.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 300 gondola car bodies.

THE FRUIT GROWERS EXPRESS is inquiring for 500 steel underframes for refrigerator cars. This is in addition to an inquiry for 150 steel underframes reported in the *Railway Age* of April 27.

Passenger Cars

THE PENNSYLVANIA is inquiring for three dining cars and four cafe cars.

THE CHICAGO & NORTH WESTERN is inquiring for five steel horse cars.

THE SOUTHERN PACIFIC has ordered 15 chair cars from the Pullman Car & Manufacturing Corporation.

THE NEW YORK, NEW HAVEN & HARTFORD is inquiring for 24 de luxe smoking cars and six de luxe smoker-baggage cars. This is in addition to previous inquiries for six dining cars, 70 coaches, three multiple unit cars and six multiple unit trailer cars reported in the *Railway Age* of May 4 and 11. Inquiry is also being made for 12 steel underframes for wooden baggage cars.

Signaling

THE INDIANAPOLIS UNION has ordered from the Union Switch & Signal Company material for an electro-pneumatic interlocking at Panhandle Junction, Ind.

THE BALTIMORE & OHIO has ordered from the Union Switch & Signal Company color-position-light automatic block signals to be installed on its line between Cumberland, Md., and Grafton, W. Va., 101 miles, double track.

THE CANADIAN PACIFIC has ordered from the General Railway Signal Company material for automatic block signals to be installed between Smith Falls, Ont., and Bedell, 21 miles. Color-light signals will be used.

THE CANADIAN NATIONAL plans the installation during 1929 of automatic block signals on its Montreal-Toronto line between Brighton, Ont., and Scarborough, 80 miles.

THE TEXAS & PACIFIC has ordered from the General Railway Signal Company material for automatic block signals to be installed between Marshall, Tex., and Shreveport, La., 42 miles. Color-light signals will be used.

Supply Trade

The Republic Iron & Steel Company has moved its Chicago office from room 758 to room 1214 McCormick Building.

The Foote Bros. Gear & Machine Company, Chicago, has moved its general offices from 215 North Curtis street to 111 N. Canal street.

L. G. Landberg, has been appointed branch manager of the Los Angeles sales office of the Wagner Electric Corporation at 1220 South Hope street.

The Rail Joint Company has been acquired by **Poor & Company** through the purchase of 96 per cent of the stock instead of 76 per cent as announced in the *Railway Age* of May 11.

The Alemite Manufacturing Corporation has purchased the Dot lubricator division of the Car Fastener Company, Cambridge, Mass., and has consolidated it with its railroad department.

Panfilo Trombetta, formerly in the industrial control department of the General Electric Company, has been appointed manager of the control research department of the **Allen-Bradley Company**, Milwaukee, Wis.

R. S. Arthur, formerly in charge of the Chicago office of the Dravo Equipment Company, has been appointed manager of the Midwestern branch office of the **Aeroil Burner Company**, West New York, N. J. Mr. Arthur's headquarters are at 176 North Wacker Drive, Chicago.

The J. G. Brill Company, Philadelphia, Pa., manufacturer of electric railway cars and trucks, self-propelled gas-electric and mechanical driven rail cars for steam railroads, and Brill steel diners has recently organized a new division to be known as the Associated Products division under the management of **J. C. Robb**, with **F. O. Paul**, formerly automotive service manager, as assistant to the division manager. The new division will control the departments of research and sales extension, and also the manufacture and distribution of new products.

B. S. Crooks, general superintendent of **A. Guthrie & Co., Inc.**, St. Paul, Minn., has been elected vice-president. **W. E. Conroy**, a superintendent for the company and recently resident superintendent on the Cascade tunnel of the Great Northern, has been promoted to general superintendent, with headquarters at Cleveland, Ohio. **A. J. Lizee**, assistant general superintendent of striping operations on the Iron range, has been promoted to general superintendent, with headquarters as before at Calumet, Minn.

Thomas C. Clark, formerly district manager, in the St. Louis territory, of the **W. N. Matthews Corporation**, St. Louis, Mo., has been appointed sales

manager of the company. The Western Kentucky part of Mr. Clark's former territory has been assigned to **John L. Reighart**, 88 Kenyon building, Louisville, Ky., and the **E. S. Stickel Company**, 934 Union Trust building, Pittsburgh, Pa., who represents the Matthews Corporation in Western Pennsylvania and West Virginia, has taken over also the state of Ohio formerly covered by **B. F. Perry** and Mr. Reighart.

The Delaware Wood Preserving Company has been organized as a subsidiary of the **Century Wood Preserving Company**, Pittsburgh, Pa., to build and operate a timber treating plant at Wilmington, Del. Two treating cylinders will be built with provision for the addition of others as needed. Three hundred acres of land have been acquired for seasoning and storage yards. **H. R. Condon** has resigned as general manager of the American Mond Nickel Company, Pittsburgh, Pa., to become vice-president and general manager of the new company with office at 1002 Finance building, Philadelphia, Pa.

The Union Carbide & Carbon Corporation has moved its Chicago district and central division offices to the new Carbide & Carbon building at Michigan avenue and South Water street, Chicago. Units of the Union Carbide & Carbon Corporation which will make this new building their Chicago headquarters are: The Linde Air Products Company, the Prest-O-Lite Company, Inc., Oxweld Acetylene Company, Oxweld Railroad Service Company, Union Carbide Sales Company, Carbide and Carbon Chemicals Corporation, National Carbon Company, Inc., Haynes Stellite Company, J. B. Colt Company and Acheson Graphite Company.

Marcus T. Lothrop, who was elected president of the **Timken Roller Bearing**



Marcus T. Lothrop

Company, Canton, Ohio, has been connected with its affairs for the past 18 years, having started work with the company in 1911 as metallurgist. Dur-

ing his service he has served in various capacities successively in metallurgy, research, in charge of operations and for the last few years as vice-president and general manager in charge of all operations and sales.

Obituary

Herman H. Hettler, president of the Herman H. Hettler Lumber Company, Chicago, and a past president of the Lumbermen's Association of Chicago, died at his home in Chicago on May 1.

J. Howard Horn, formerly general manager of sales of the National Lock Washer Company, Newark, N. J., and a past president of the Track Supply Association, died on May 13 at his summer home, Mason's Island, Conn. Mr. Horn was born in September, 1885, received his early education at Newark Academy, Newark, N. J., and was graduated from Princeton University in the class of 1907. He began work with the Cooke Locomotive Works, Paterson, N. J., and later was engaged in the advertising business in New York City. He entered the service of the National Lock Washer Company in 1910 becoming general manager of sales in 1925. Due to illness, Mr. Horn had not been active in business for the past two years.

Harry H. Schroyer, vice-president of the **Morton Manufacturing Company**, Chicago, died on May 11, at Hayward, Wis. He was born in Lock Haven, Pa., in 1862 and came to Chicago in 1896 to enter the employ of the Chicago & North Western. He remained with this company until 1903, when he resigned to enter the railway supply field and shortly thereafter to organize the Acme Supply Company. The business continued under his name until 1917, when the corporate name was changed to the Dunbar Manufacturing Company. In November, 1920, the name was again changed to the Morton Manufacturing Company, its present corporate title. Due to failing health, Mr. Schroyer had been inactive during the past 12 years.

Trade Publication

THE MARTIN CIRCULATOR.—The Martin Circulator for generating rapidly moving water into steam in the bottom of the firebox of an oil-burning locomotive is described in the attractive 16-page booklet, Bulletin No. 102, issued by the Locomotive Boiler Economizer Company, Roosevelt building, Los Angeles, Cal. Diagrammatic illustrations show details of construction, pumping action, and how the tables are positioned in the bottom of the firebox to receive the radiant heat from the flame of the oil fire. The water-circulating steam-generating elements which form the bottom of the firebox comprise quadrangular shaped hollow tables with staybolted surfaces constructed of steel plate of the same thickness as the sheets of the firebox. Upon installation, they form a continuation of the water legs of the firebox.

Construction

ALGOMA CENTRAL & HUDSON BAY.—A contract has been awarded to A. B. McLean & Sons, Sault Ste. Marie, Ont., for the dredging and other construction in connection with the building of a concrete and steel coal dock at Michipicoten, Ont., at a cost of \$65,000. A contract for supplying the material and erecting a steam-operated unloading bridge at an estimated cost of \$220,000 has been let to the Canadian Mead-Morrison Company, Montreal, Que.

CANADIAN NATIONAL.—During 1929 it is planned to construct second main track and revise grades between Middleboro, Man., and South Junction, 4.2 miles, between Woodbridge, Man., and Baynham, 6.2 miles, and between South Saskatoon, Sask., and Chappell Junction. The first two projects will require an expenditure of about \$450,000.

CANADIAN PACIFIC.—Contracts for the grading of 177 additional miles of branch lines in British Columbia, Alberta and Saskatchewan, have recently been let by this company. The various lines which will soon be placed under construction and the contractors are: From Nipawin, Sask., toward Prince Albert, 25 miles, to Fred Mannix, Calgary, Alta.; from Kootenay Landing, B. C., to Proctor, 35 miles, to Dutton & Grant, Winnipeg, Man.; from Lake Johnson, Sask., to Wymark, 27 miles, to Riley, Reid & Sandgren, Edmonton, Alta.; from Arrowwood, Alta., to Blackie, 25 miles, to Tomlinson Construction Company, Ltd., Winnipeg; from Willingdon, Alta., to Vegreville, 25 miles, to Brooks Construction Company, Prince Albert, and from Unwin to a point 20 miles west, to Roosa & Wickstrand, Vermilion, Alta. A contract has also been let to Stewart & Cameron, Winnipeg, for the construction of a 20-mile extension of the Lacombe & North Western in Alberta.

CENTRAL OF NEW JERSEY.—The Board of Public Utility Commissioners of New Jersey has ordered this company to eliminate some 20 highway grade crossings in Elizabeth, N. J., work to begin by January 1, 1931, and be completed within three years.

CHICAGO, ROCK ISLAND & PACIFIC.—The Interstate Commerce Commission has authorized the St. Paul & Kansas City Short Line and the Chicago, Rock Island & Pacific, which latter corporation controls the former, to construct a line from Coburn, Mo., southwesterly to Birmingham, 71.45 miles. The former company is to undertake the construction and it is also authorized to operate over the Rock Island from Allerton, Ia., southwesterly to Coburn, 61.9 miles. The Rock Island plans to acquire control of the new line by lease when it is completed. The purpose of the new line is to give the Rock Island a new connection into Kansas City from the north and

east. At the present time it operates over the Chicago, Burlington & Quincy from Cameron Junction to Harlem, 51.7 miles, under a lease which terminates on December 31 of this year. From Trenton, Mo., (the first freight division point northeast of Kansas City) to Birmingham, 91.5 miles, the present route has 1.4 per cent ruling grades in both directions and heavy curves. The new line will have 0.5 per cent ruling grades and 2 deg. maximum curvature and will reduce the distance from Kansas City to Trenton by about 9 miles. At Birmingham a connection would be made with one of the three railroads running from that point to Kansas City. The estimated cost of the project is \$11,472,658.

CHICAGO, BURLINGTON & QUINCY—WABASH.—An application has been filed with the Missouri Public Service Commission to authorize the Missouri Highway Commission, and these two railroads to construct a reinforced concrete viaduct over their tracks at Chillicothe, Mo. The cost of the viaduct, which will be borne by the state and the railroads, will be about \$66,000.

CHICAGO, BURLINGTON & QUINCY.—This company plans the construction of a 1,000,000-bu. addition to its recently acquired grain elevator and warehouse at St. Louis, Mo.

GREAT NORTHERN.—A contract has been let to A. Guthrie & Co., St. Paul, Minn., for the construction of second main track between Williston, N. D., and Mondak, Mont., about 23 miles. The work involves the excavation of about 500,000 cu. yd. of earth.

HOCKING VALLEY.—A contract for dredging, including the construction of slips and docks in connection with the development of the Presque Isle terminal at Toledo, Ohio, has been let to the Great Lakes Dredge & Dock Company, Chicago, at a cost of about \$1,750,000. The construction of new yards which will have a combined capacity of 5,075 cars will be undertaken by company forces at an estimated cost of \$700,000.

MICHIGAN CENTRAL.—A contract has been let to D. W. Thurston, Detroit, Mich., for the renewal of a bridge over Kettle creek, at St. Thomas, Ont., at a cost of about \$400,000. The new bridge will be constructed with six girder spans on concrete piers 100 ft. above the elevation of water in Kettle creek.

PENNSYLVANIA.—This company and the Pittsburgh, Cincinnati, Chicago & St. Louis have applied to the Interstate Commerce Commission for authority to build a branch line from Duck Creek to East Norwood, Ohio, 1.2 miles, to connect with the tracks of the Baltimore & Ohio. The Pennsylvania and the Norfolk & Western have applied to the com-

mission for authority to use the tracks of the Baltimore & Ohio from East Norwood to a junction with the passenger tracks of the Cincinnati Union Terminal Company.

PENNSYLVANIA.—A contract has been awarded to the Vare Construction Company, Philadelphia, Pa., for the construction of foundations for the support of the electrification structures on this company's lines between North Philadelphia and Liddonfield, Pa., at an approximate cost of \$300,000. Contracts also have been awarded to the Arundel Corporation, Baltimore, Md., for the relocation of the Jones Falls interceptor sewer, east of the station at Baltimore, Md., the work to cost \$50,000; to the F. Guy Meyers Company, Inc., Philadelphia, Pa., for the paving and re-arrangement of tracks in the Water street yard in connection with the new produce stores at Washington, D. C., to cost approximately \$38,000, and to C. M. Johnston, Philadelphia, for the construction of an under grade bridge to eliminate a grade crossing at Mohrsville, Pa., at an expenditure of about \$25,000.

PITTSBURGH & WEST VIRGINIA.—Contracts for the erection of the superstructure and the construction of the substructure of an 800-ft. bridge at Cochran Mills, Pa., at a cost of \$100,000, have been let to the American Bridge Company, Pittsburgh, Pa., and to Greeley & Holmes, Pittsburgh, respectively. The general contract has been let to the McClintic Marshall Company, Pittsburgh, for the construction of a steel and concrete bridge, 2,500 ft. in length, over Pidgeon creek near Donora, Pa. The cost of this structure is estimated at \$250,000. The American Bridge Company and Greeley & Holmes have also been awarded contracts for the construction respectively of the superstructure and the substructure of a bridge over Peters creek at Gastonville, Pa. This bridge will consist of a 200-ft. truss span and a 100-ft. girder span and will require an estimated expenditure of \$100,000.

WABASH.—Representatives of this railroad and the City of St. Louis, Mo., have reached an agreement for the elimination of grade crossings at Lindell drive and Union boulevard. Plans involve depressing the railroad tracks at those points. The cost of a highway viaduct over the tracks is estimated at \$480,000, part of which will be borne by the city. It is expected that construction will be started within a year and that this work will be followed by the elimination of grade crossings on De Baliviere and Hamilton avenues and Waterman boulevard.

WAYNE COUNTY, MICH.—The county authorities plan the elimination of a grade crossing on Southfield road at Ecorse, a suburb of Detroit, in conjunction with the New York Central, the Michigan Central, the Detroit, Toledo & Ironton and the Detroit & Toledo Shore Line. The tracks of the four companies parallel each other at this point and each railroad will construct its own structure over the highway.

Railway Finance

ALLEGHANY CORPORATION.—*Preferred Stock.*—This company, which is controlled by the Van Sweringen interests, is offering at par through a syndicate of bankers \$25,000,000 of its 5½ cumulative preferred stock, Series A.

BOSTON & MAINE.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of \$1,710,000 of equipment trust certificates, to be sold at 98.52, in accordance with the most favorable bid received, which was that of Brown Brothers & Co., of Boston on behalf of themselves and Evans, Stillman & Co., New York.

CENTRAL OF GEORGIA.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue \$11,000,000 of refunding and general mortgage 5 per cent bonds, Series C, for the conversion of a like amount of refunding and general mortgage 6 per cent bonds, Series A, which bonds are now pledged as security for \$8,000,000 of the company's 6 per cent secured bonds which mature on June 1. A total of \$10,000,000 of the Series C bonds are authorized to be sold at 95.5 to Kuhn Loeb & Company, making the average annual cost to the railroad 5.3 per cent. The remaining \$1,000,000 of these bonds will be held in the company's treasury. The issue will mature in 1959.

CHESAPEAKE CORPORATION.—*Stock.*—The directors of this company have approved a common stock dividend of 33-1/3 per cent payable July 1 to stock of record of June 27, subject to the approval of the stockholders. The directors have also authorized the issuance of 450,000 additional no par shares to which stockholders of record May 22 are to be given the right to subscribe on the basis of one-half share for each share now held, at the rate of \$50 a share. A stock dividend is also declared on the stock to be offered for subscription.

CHESAPEAKE & OHIO.—*Equipment Trust Certificates.*—The Bankers Company of New York and Evans, Stillman & Co., are offering \$5,025,000 of this company's 4½ per cent equipment trust certificates, series of 1929, priced to yield 5.75 per cent to 4.90 per cent and maturing between 1930 and 1944.

CHICAGO & ILLINOIS WESTERN.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized this company to issue \$500,000 of equipment trust certificates of May 1, 1929, the certificates to be sold through competitive bidding to the highest bidder, but at not less than par. The certificates will bear interest at the rate of 5 per cent and will mature between 1932 and 1936.

CHICAGO & NORTH WESTERN.—*Bonds.*—

The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of \$1,375,000 of general mortgage 4½ per cent bonds of 1987, to be held in its treasury in reimbursement of expenditures for the retirement of securities.

CHICAGO & NORTH WESTERN.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to assume obligation and liability in respect of \$4,950,000 of equipment trust certificates of 1927 and \$3,825,000 of 1929.

DELAWARE, LACKAWANNA & WESTERN.—*Morris & Essex Bonds.*—The Interstate Commerce Commission has authorized the Morris & Essex, a subsidiary of the Lackawanna, to issue \$15,000,000 of Construction mortgage bonds, Series B, to be delivered to the parent company in partial reimbursement of expenditures for additions and betterments. The Lackawanna has been authorized to assume obligation and liability as guarantor of these bonds. No arrangements have thus far been made for their sale.

DENISON, BONHAM & NEW ORLEANS.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon, as to interstate and foreign commerce, its line from Bonham, Tex., to Bona, 24.2 miles.

DENVER & SUMMIT.—*Incorporation to Take Over C. & S. Branch.*—This company was incorporated at Denver, Colo., on May 6 with a capitalization of \$3,000,000 to take over and operate the 185-mile branch of the Colorado & Southern between Denver, Colo., and Leadville. Three residents of Denver, W. C. Johnston, J. W. Reed and Max P. Zall, were named as the incorporators. Previously the Colorado & Southern had offered to give this branch to any person or group who would guarantee to operate it.

DULUTH, SOUTH SHORE & ATLANTIC.—*Annual Report.*—The annual report of this company for 1928 shows net deficit after interest and other charges of \$459,954, as compared with net deficit in 1927 of \$269,736. Selected items from the income statement follow:

	1928	1927	Increase or Decrease
Average mileage operated	577.44	588.39	— 10.95
RAILWAY OPERATING REVENUES	5,045,857	5,121,693	— 75,836
Maintenance of way	919,568	886,358	33,210
Maintenance of equipment	809,183	809,775	— 592
Transportation	2,136,393	2,089,334	47,059
TOTAL OPERATING EXPENSES	4,132,799	4,061,518	71,281
Operating ratio	81.90	79.30	2.60
NET REVENUE FROM OPERATIONS	913,059	1,060,175	—147,116

Railway tax accruals	399,464	370,886	28,578
Railway operating income	513,560	689,274	—175,714
Hire of freight cars—Dr.	132,094	123,354	8,740
Joint facility rents	57,820	52,503	5,317
Non-operating income	110,323	116,632	— 6,309
GROSS INCOME	623,883	805,906	—182,023
Interest on funded debt	874,183	876,383	— 2,200
TOTAL DEDUCTIONS FROM GROSS INCOME	1,083,836	1,075,642	8,194
NET DEFICIT	459,954	269,736	190,218

ETTRICK RAILROAD.—*Authorized to Operate.*—The Interstate Commerce Commission has authorized this company to operate the railroad formerly operated by the Ettrick & Northern, extending from Ettrick, Wis., northerly to Blair, 11 miles, where it connects with the Green Bay & Western.

ILLINOIS CENTRAL.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$6,990,000 of 4½ per cent equipment trust certificates, Series P, which certificates will be sold at 96.637 to the Bankers Company of New York, the Continental Illinois Company and Evans, Stillman & Co., making the average annual cost to the railroad 5.04 per cent. The certificates will mature between 1930 and 1944.

INTERNATIONAL-GREAT NORTHERN.—*Annual Report.*—The annual report of this company for 1928 shows net income of \$10,181, as compared with net income of \$33,950 in 1927. Selected items from the income statement follow:

	1928	1927	Increase or Decrease
Average mileage operated	1,159.50	1,159.50	.....
RAILWAY OPERATING REVENUES	18,855,805	18,428,470	427,335
Maintenance of way	2,871,501	3,266,301	—394,799
Maintenance of equipment	3,211,775	3,273,793	62,018
Transportation	7,455,138	7,356,863	98,275
TOTAL OPERATING EXPENSES	14,714,453	14,954,672	240,219
Operating ratio	78.04	81.15	3.11
NET REVENUE FROM OPERATIONS	4,141,352	3,473,798	667,554
Railway tax accruals	497,089	496,515	574
Railway operating income	3,632,212	2,970,535	661,678
Hire of freight cars—Dr.	793,784	575,047	218,737
Joint facility rents—Dr.	74,392	92,811	—18,419
NET RAILWAY OPERATING INCOME	2,626,723	2,177,822	448,900
Non-operating income	145,244	74,371	70,874
GROSS INCOME	2,771,967	2,252,193	519,774
Interest on funded debt	2,745,461	2,135,422	610,039
TOTAL DEDUCTIONS FROM GROSS INCOME	2,761,786	2,218,243	543,543
NET INCOME	10,181	33,950	23,769
MAINE CENTRAL.			
<i>Equipment Trust Certificates.</i> —The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$1,628,000 of 5 per cent equip-			

ment trust certificates of 1929. The certificates will mature from December 1, 1929, to 1944. The certificates were sold at par to the highest bidder, the Standard Steel Car Company.

MISSOURI PACIFIC.—Equipment Trust Certificates.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect to \$8,925,000 of equipment trust certificates, Series F, to be sold at 95.7 to the First National Bank (New York) and Salomon Bros. & Hutzler, making the average annual cost to the railroad 5.198 per cent. The certificates will pay dividends at the rate of 4½ per cent and will mature from 1930 to 1944.

MOBILE & OHIO.—Control.—Three stockholders of this company have filed suit in the New York Supreme Court naming four defendants, the Southern Railway, the Mobile & Ohio, the Farmers Loan & Trust Company and the Guaranty Trust Company. The plaintiffs seek the dissolution of control of the Mobile & Ohio by the Southern Railway. The Farmers Loan & Trust Company has been brought into the case as trustee and the Guaranty Trust Company is named as custodian of the voting control pledged as security for certificates outstanding.

NEW YORK CENTRAL.—Operation of Short Line.—The Interstate Commerce Commission has authorized the Cleveland, Cincinnati, Chicago & St. Louis to abandon the operation of the Mount Gilead Short Line Railway, 2.1 miles, in Ohio; the New York Central, through the Toledo & Ohio Central, to construct a connecting track to this line and to undertake its operation henceforth.

NEW YORK, CHICAGO & ST. LOUIS.—Annual Report.—The annual report of this company for 1928 shows net income after interest and other charges of \$6,378,710, as compared with net income of \$6,639,477 in 1927. Selected items from the income statement follow:

	NEW YORK, CHICAGO & ST. LOUIS	Increase or Decrease
	1928	1927
RAILWAY OPERATING REVENUES	52,876,520	53,619,600
Maintenance of way	6,615,575	6,683,235
Maintenance of equipment	9,829,183	10,137,157
Transportation	18,505,413	18,587,977
TOTAL OPERATING EXPENSES	37,866,536	38,574,494
Operating ratio	71.61	71.94
NET REVENUE FROM OPERATIONS	15,009,984	15,045,106
Railway tax accruals	2,981,124	2,719,955
Railway operating income	12,020,555	12,320,988
Hire of freight cars—Dr.	2,436,081	2,305,107
Joint facility rents	145,661	69,473
Non-operating income	3,230,706	3,089,346
GROSS INCOME	15,251,261	15,410,333
Rent for leased roads	1,457	4,202
Interest on funded debt	5,284,222	5,325,125
TOTAL DEDUCTIONS FROM GROSS INCOME	8,872,551	8,770,856
	101,695	

NET INCOME ..	6,378,710	6,639,477	—260,767
Disposition of net income			
Income applied to sinking funds	98,935	98,224	711
Dividend appropriations of income ..	4,084,046	4,540,839	—456,793
Surplus for year carried to profit and loss ..	2,195,730	2,000,413	195,317

PENNSYLVANIA.—Violation of Clayton Law Charged.—The Interstate Commerce Commission on May 14 issued a complaint directed against the Pennsylvania Railroad and the Pennsylvania Company, charging, "on information and belief," violation of section 7 of the Clayton anti-trust law in the acquisition by the Pennsylvania "through and by means of its subsidiary corporation" of 312,900 shares of preferred "A" stock and 362,900 shares of common stock of the Wabash and 365,039 shares of common stock of the Lehigh Valley, without the approval and authorization of the commission. The effect of such purchases, the complaint says, may be to substantially lessen competition between the Pennsylvania Railroad and the other two roads. The case has been set for hearing on June 24 at Washington, when the two companies may appear and show cause why an order should not be entered requiring them to divest themselves of all interest, direct or indirect, in the stock of the Wabash and the Lehigh Valley. The complaint alleges that the Pennsylvania Railroad indirectly and the Pennsylvania Company directly acquired the shares mentioned and that the Wabash holds of record 231,329 shares, or 19 per cent of the outstanding stock of the Lehigh Valley.

PENNROAD CORPORATION.—P. R. R. Employees May Buy Stock.—Employees of the Pennsylvania Railroad who are at present buying from one to nine shares of its capital stock on the deferred payment plan, will have an opportunity to buy common stock of the newly formed Pennroad Corporation, according to an announcement made by H. H. Lee, president of the Pennroad Corporation. Voting trust certificates for 8,500,000 shares of common stock of the Pennroad Corporation, the investment company recently incorporated with an authorized issue of 10,000,000 shares of common stock without par value, are being offered, first of all, to Pennsylvania Railroad stockholders of record on May 10. Each two shares of Pennsylvania Railroad Company stock entitles the owner to subscribe for one share of Pennroad Corporation stock at \$15 a share. Last September approximately 100,000 employees of the Pennsylvania Railroad Company subscribed to \$17,500,000 worth of the company's capital stock at the par value of \$50 a share. These shares are being paid for through monthly payroll deductions. None of these employee-subscribers is registered on the company's books as stockholders because payments have not been completed.

Directors.—The board of directors of the Corporation is composed of W. W. Atterbury, Effingham B. Morris, Charles E. Ingersoll, Levi L. Rue, Jay Cooke, R. E. Mellon and A. J. County, all of whom

are also directors of the Pennsylvania Railroad, and Henry H. Lee, who has been elected president of the new corporation. Mr. Lee, who has been treasurer of the Pennsylvania Railroad since June 1924, has resigned that office and all affiliations with the Pennsylvania Railroad in order to accept his new post as president of the Pennroad Corporation.

SOUTHERN.—Anti-Trust Case.—The Interstate Commerce Commission heard arguments on May 11 on the Southern's motion for a dismissal of the commission's complaint against it for alleged violation of the Clayton anti-trust law in acquisition of control of the Mobile & Ohio in 1901 and of the New Orleans & Northeastern in 1916. S. R. Prince, general solicitor of the Southern, argued that the Clayton law of 1914 was not retroactive and that if the complaint as to the Mobile & Ohio falls for that reason the complaint as to the N. O. & N. E. would also fall. He also said that the Clayton law expressly states that it shall not apply to rights legally acquired before its passage. He quoted extensively from the legislative history of the act to show that it was not intended to apply to previous transactions and he said the motion might also have been based on laches, because the commission had had full knowledge of the facts for 28 years before issuing its complaints. The commission was urged to take jurisdiction over the matter, so as to allow the courts to pass upon it, by counsel for the city of Mobile and John H. Jones, a taxpayer who had filed complaints asking the commission to require the Southern to divest itself of its stock in the other two companies. W. H. Ambrecht, appearing for the city, took the position that the prohibition against acquisition of stock included the continued "holdings" of such stock, and he said the Southern has kept adding to its holdings of Mobile & Ohio since 1901. When Congress said that nothing in the act should apply to rights legally acquired before, he said, it showed that it meant to apply its prohibition to rights "illegally" acquired.

TENNESSEE CENTRAL.—Annual Report.—The annual report of this company for the year 1928 shows net income after interest and other charges of \$123,245, as compared with net income of \$36,799 in 1927. Selected items from the income statement follow:

	TENNESSEE CENTRAL	Increase or Decrease	
	1928	1927	
Average mileage operated	296.33	296.34	—.01
RAILWAY OPERATING REVENUES	3,256,511	3,279,560	—23,049
Maintenance of way	687,819	663,833	23,986
Maintenance of equipment	444,865	571,299	—126,434
Transportation	1,155,821	1,203,828	—48,007
TOTAL OPERATING EXPENSES	2,545,643	2,696,636	—150,993
Operating ratio	78.17	82.23	—4.06
NET REVENUE FROM OPERATIONS	710,868	582,924	127,944
Railway tax accruals	88,002	72,601	15,401
Railway operating income	622,180	509,953	112,227

(Continued on page 1185)

Annual Reports

The Central Railroad Company of New Jersey— Year Ended December 31, 1928

New York, N. Y., April 11th, 1929.

TO THE STOCKHOLDERS:

The Board of Directors herewith submits report of the operations and affairs of the Company as of December 31, 1928.

CORPORATE INCOME STATEMENT For the Year Ended December 31, 1928, Compared with the Previous Year

	1928	1927	Changes
Railway Operating Revenues	\$58,002,056.97	\$58,745,711.80	Dec. \$ 743,654.83
Railway Operating Expenses	42,122,159.58	43,344,246.75	Dec. 1,222,087.17
Net Operating Revenue	\$15,879,897.39	\$15,401,465.05	Inc. \$ 478,432.34
Railway Tax Accruals	\$ 5,059,306.60	\$ 3,738,301.94*	Inc. \$ 1,321,004.66
Uncollectible Railway Revenue	17,469.85	13,970.90	Inc. 3,498.95
Hire of Equipment	1,144,902.40	918,444.90	Inc. 226,457.50
Joint Facility Rents	273,161.29	347,094.70	Dec. 73,933.41
Charges to Net Operating Revenues	\$ 6,494,840.14	\$ 5,017,812.44	Inc. \$ 1,477,027.70
Net Railway Operating Income	\$ 9,385,057.25	\$ 10,383,652.61	Dec. \$ 998,595.36
Non-Operating Income	2,649,955.66	1,684,807.59	Inc. 965,148.07
Total Income from all Sources	\$12,035,012.91	\$12,068,460.20	Dec. \$ 33,447.29
Deductions for Rentals	\$ 2,696,582.85	\$ 2,680,765.66	Inc. \$ 15,817.19
Deductions for Interest	2,966,152.14	3,554,422.32	Dec. 588,270.18
Miscellaneous Tax Accruals	307,047.45	346,128.86*	Dec. 39,081.41
All Other Charges against Income	13,520.80	14,539.67	Dec. 1,018.87
Total Deductions from Income	\$ 5,983,303.24	\$ 6,595,856.51	Dec. \$ 612,553.27
Balance Transferred to Profit and Loss	\$ 6,051,709.67	\$ 5,472,603.69	Inc. \$ 579,105.98

General

OPERATIONS FOR THE YEAR: The Income Statement reflects the result of operations for the year. Operating Revenues aggregated \$58,002,056.97; Operating Expenses \$42,122,159.58, and Net Revenue from Railway Operations, \$15,879,897.39. While Operating Revenues decreased \$743,654.83 as compared with the previous year, in line with the general decline in business throughout the country, Railway Operating Expenses decreased \$1,222,087.17, increasing Net Revenue from Railway Operations \$478,432.34.

The Operating Ratios for 1927 and 1928 are shown for contrast:

Operating Ratio 1927	73.78%
Operating Ratio 1928	72.62%
Decrease	1.16%

FREIGHT TRAFFIC: During the first half of the year, owing to the general unsettled conditions prevailing throughout the country, traffic offered for movement was subnormal. Beginning in July and continuing throughout the balance of the year, changed conditions resulted in the movement of a larger volume, of which your Company enjoyed its share. There were no major or general reductions in freight rates during the year; however, there were numerous downward revisions in individual tariffs.

PASSENGER TRAFFIC: Passenger Train Revenue, including Express Revenue, decreased \$423,667, notwithstanding an increase in Commutation travel. The falling off in general passenger traffic may be attributed to the increased use of privately owned automobiles and motor bus competition. This condition is not peculiar to the territory served by your Company, but is general throughout the country, particularly affecting long haul, sea-shore and week-end travel. This Company is operating motor buses on selected routes and studies are being made by the Management with the view of enlarging this character of service.

TRACK IMPROVEMENTS: There were laid in replacement during the year:

129,659 Cross Ties.
16,563 Cubic Yards of Stone Ballast.
30.39 Miles of Main Track, with new steel rails of 100, 130, and 135 lb. section.
25.13 Miles of Main Track, with second hand rails of 80 to 135 lb. section.
0.18 Miles of Side Track, with new rails of 100 lb. section.
34.54 Miles of Side Track, with second hand rails of 70 to 135 lb. section.

ROADWAY, SHOP AND POWER PLANT TOOLS AND MACHINERY: The program of modernizing tools and machinery, has been continued during the year. Expenditures made for additions and betterments, or in replacement of such equipment, aggregate \$292,414.

NEW EQUIPMENT: There were placed in service during the year 1928 five Pacific type locomotives provided for in Equipment Contracts made during 1927 which completed the purchase of equipment through that lease.

TAXES: The taxes levied by Local, State and Federal Authorities during 1928, aggregated \$5,366,354, an increase over the preceding year of \$135,247. Taxes paid during 1928 represent 9.25% of Gross Operating Revenue, or 33.79% of Net Operating Revenue, and exceed total annual dividend payment to Stockholders by 62.99%. Substantial increases in Taxes have resulted from Capital Expenditures made for non-productive improvements, such as improved bridge facilities, grade crossing eliminations, etc., the cost of which has had to be borne entirely by the Company. The increasing highway traffic in the territory served by your line is constantly bringing other grade crossing elimination projects up for consideration, and the increasing tax levies will continue to be a serious problem.

NOTE: Railway Taxes for the years 1921 to 1927, inclusive, were accrued on basis of assessments. Due to litigation consummated in 1927 the assessments for these years were reduced by amounts aggregating \$1,146,676.65. This adjustment occasioned a corresponding reduction of the normal accrual to this account in 1927. On basis of taxes levied or assessed for the year 1927 Railway Tax Accruals would have amounted to.....\$4,884,978.59 Miscellaneous Taxes amounted to.....346,128.86

Total \$231,107.45

Additions and Betterments

Special mention is made of the following items:

NEWARK BAY BRIDGE: The remaining work on the bridge and approaches was completed during the year, thereby terminating the largest single construction project ever undertaken by your company. The cost was \$12,989,534.

ELIMINATION OF GRADE CROSSINGS AT PERTH AMBOY: This work was completed during the year; the new interlocking plant at Woodbridge Junction being placed in service April 20th, and the new passenger station being opened to the public on June 29th. The total cost of the project was \$2,152,342.

AUTOMATIC TRAIN CONTROL: The coded continuous system of train control and automatic stop and forestaller and a new three-block color light block signal system between Elizabethport and Perth Amboy, work on which was started in 1927, were completed and placed in service on May 28th. The cost of this work was \$490,397.

On the same date a similar system of train control and signals was placed in service on the New York and Long Branch Railroad between Perth Amboy, N. J., and Bayhead Junction, N. J., thereby providing continuous automatic train control operation between Elizabethport, N. J. and Bayhead Junction, N. J.

During the year a similar installation of train control together with color light headblock signals, but without wayside automatic block signals, the signals appearing only in the cab of the engine, was authorized for the single track line of the New Jersey Southern Division between Matawan, N. J. and Atlantic Highlands, N. J. Work on this installation was started late in the year and it will be placed in service early in 1929. The estimated cost is \$80,800.

BETHLEHEM ENGINE TERMINAL: This project was completed and all of its facilities placed in service during the year. The total cost was \$1,499,037.

ELIMINATION OF GRADE CROSSINGS THROUGH CRANFORD: Negotiations started in 1926 for the acquisition of the necessary additional land were successfully concluded in the forepart of the year. Temporary main tracks for the handling of traffic during the construction period were built and placed in service. Active work on the new bridges and embankment was started in the fall and at the end of the year excellent progress had been made. The work is scheduled for completion in the fall of 1930 and is estimated to cost \$2,300,000.

Special Comment

FEDERAL VALUATION: You were informed in report for the year 1927 that final brief submitting the case for decision was filed on February 18, 1927. No decision has been made as yet. Supplement No. 5 to Valuation Order No. 3 became effective July 1, 1928 and prescribes detailed instructions to govern the reporting of property added and property retired between Valuation Date and December 31, 1927.

DEPRECIATION ACCOUNTING: With further reference to the Interstate Commerce Commission's Docket 15,100, entitled "Depreciation Charges of Steam Railroad Companies, Decided November 2, 1926." Hearings upon this Docket were

General Balance Sheet December 31, 1928, Compared with December 31, 1927

Assets	December 31, 1928	December 31, 1927	+ Increase — Decrease	Liabilities	December 31, 1928	December 31, 1927	+ Increase — Decrease
Investments:				Stock:			
Road	\$93,548,788.27	\$90,915,845.45	+\$2,632,942.82	Capital Stock, Common—			
Equipment	71,062,342.06	72,158,537.75	— 1,096,195.69	Authorized \$30,000,000.00			
Total	\$164,611,130.33	\$163,074,383.20	+\$1,536,747.13	Not Issued 2,563,200.00			
Improvements on Leased Railway Property	\$13,442,936.96	\$13,091,659.00	+\$351,277.96	Outstanding	\$27,436,800.00	\$27,436,800.00	.....
Miscellaneous Physical Property	3,463,810.97	3,196,636.58	+\$267,174.39				
Investments in Affiliated Companies,							
Stocks	3,820,490.22	3,701,870.22	+\$118,620.00	Funded Debt Unmatured.			
Bonds	1,636,000.00	1,686,000.00	— 50,000.00	Equipment Obligations in Co.'s Treasury....	\$800,000.00	\$1,000,000.00	— \$200,000.00
Advances	3,910,846.96	3,595,187.79	+\$315,659.17	Equipment Obligations with Public	10,357,500.00	11,939,000.00	— 1,581,500.00
Notes	40,000.00	40,000.00	.....	Mortgage Bonds in Co.'s Treasury	1,074,000.00	1,167,000.00	— 93,000.00
Other Investments,				Mortgage Bonds with Public	48,924,000.00	43,924,000.00	+\$5,000,000.00
Stocks	20,120.90	20,035.02	+\$85.88	American Dock & Imp't Co.'s Bonds with Public			
Bonds	9,713,347.50	10,774,336.66	— 1,060,989.16	American Dock & Imp't Co.'s Bonds in Co.'s Treasury		4,979,000.00	— 4,979,000.00
Miscellaneous	3,050.00	3,150.00	— 100.00				
Total	\$36,050,603.51	\$36,108,875.27	— \$58,271.76				
				Total	\$61,155,500.00	\$63,017,000.00	— \$1,861,500.00
Current Assets:							
Cash	\$2,628,392.45	\$1,761,913.04	+\$866,479.41				
Special Deposits	56,841.65	328,323.96	— 271,482.31				
Loans and Bills Receivable	1,000,000.00	.....	+\$1,000,000.00				
Traffic and Car Service Balances Receivable	1,095,093.05	1,022,986.51	+\$72,106.54				
Net Balance Receivable from Agents and Conductors	779,164.69	620,113.04	+\$159,051.65				
Miscellaneous Accounts Receivable	1,786,385.55	1,968,685.39	— 182,299.84				
Material and Supplies	3,224,376.57	4,307,010.22	— 1,082,633.65				
Interest and Dividends Receivable	149,485.41	207,164.30	— 57,678.89				
Total	\$10,719,739.37	\$10,216,196.46	+\$503,542.91				
Deferred Assets:							
Working Fund Advances	\$104,769.10	\$4,912.55	+\$99,856.55				
Insurance and Other Funds	83,882.37	63,618.37	+\$20,264.00				
Other Deferred Assets	152,950.58	170,128.56	— 17,177.98				
Total	\$341,602.05	\$238,659.48	+\$102,942.57				
Unadjusted Debits:							
Rents and Insurance Premiums Paid in Advance	\$681,590.13	\$751,699.94	— \$70,109.81				
Other Unadjusted Debits	3,010,411.46	2,920,875.72	+\$89,535.74				
Securities Issued or Assumed—Unpledged	1,874,000.00	2,175,000.00	— 301,000.00				
Total	\$5,566,001.59	\$5,847,575.66	— \$281,574.07				
Grand Total	\$217,289,076.85	\$215,485,690.07	+\$1,803,386.78				

concluded in November 1928. The effective dates prescribed by the Order have been indefinitely postponed.

GENERAL MORTGAGE CHANGE: As of January 1, 1928, the bonds of the American Dock and Improvement Company, then outstanding and due in 1936, in the amount of \$4,979,000, bearing 6%, and \$8,000 held in Treasury, were retired. This was accomplished through the issue of authorized General Mortgage Bonds in the amount of \$5,000,000, bearing 4% resulting in a substantial decrease in annual interest payments.

HIBERNIA MINE R.R.: The Interstate Commerce Commission by an Order dated August 2, 1928, approved and authorized the acquisition of the Capital Stock of the Hibernia Mine

Railroad Company. Your Company acquired by purchase and held as of December 31, 1928—1,977 shares out of the total issue of 2,000 shares.

MARINE REPAIR YARD: On July 1, 1928, as result of settlement of litigation which had been pending, certain ship yard facilities located on property of the Company previously under lease, were acquired. The plant has been reconditioned, and your Company is accomplishing repairs to its floating equipment on an enlarged scale, thus materially reducing the volume of contract work placed with outside companies.

INSURANCE RESERVE FUND: Your Company has established an Insurance Reserve Fund. In this Fund insurance is carried on selected properties where the risk is of a nature warranting that action. Further study is being made of the Insurance question as a whole which should result in the steady growth of this Reserve.

NEW INDUSTRIES: During the year, a total of 63 new industries were located at various points where they will be served by your Company.

The Management records its appreciation of the faithful and efficient services rendered by the officers and employees of the Company during the past year.

order of the Board of Directors.
R. B. WHITE, *President.*

28, Compared with December 31, 1927				
Liabilities	December 31, 1928	December 31, 1927	+ Increase — Decrease	
<i>Stock:</i>				
Capital Stock, Common				
Authorized \$30,000,000.00				
Not Issued 2,563,200.00				
Outstanding \$27,436,800.00	\$27,436,800.00			
<i>Long Term Debt:</i>				
Funded Debt Unmatured, Equipment Obligations in Co.'s Treasury.....	\$800,000.00	\$1,000,000.00	—	\$200,000.00
Equipment Obligations with Public 10,357,500.00	11,939,000.00	—	1,581,500.00	
Mortgage Bonds in Co.'s Treasury 1,074,000.00	1,167,000.00	—	93,000.00	
Mortgage Bonds with Public 48,924,000.00	43,924,000.00	+	5,000,000.00	
American Dock & Imp't Co.'s Bonds with Public	.....	4,979,000.00	—	4,979,000.00
American Dock & Imp't Co.'s Bonds in Co.'s Treasury .....	.....	8,000.00	—	8,000.00
Total \$61,155,500.00	\$63,017,000.00	—	\$1,861,500.00	
<i>Current Liabilities:</i>				
Traffic and Car Service Balances Payable.....	\$2,056,574.43	\$1,728,010.95	+	\$328,563.48
Audited Accounts and Wages Payable 3,220,302.95	3,812,225.16	—	591,922.21	
Miscellaneous Accounts Payable 885.60	1,860.38	—	974.78	
Interest Matured Unpaid Dividends Matured Unpaid	879,076.25	931,188.75	—	52,112.50
Funded Debt Matured Unpaid 51,560.50	43,550.50	+	8,010.00	
Unmatured Dividends Declared 18,381.60	6,831.60	+	11,550.00	
Unmatured Interest Ac- crued 1,097,472.00	1,097,472.00		.....
Unmatured Rents Ac- crued 184,058.75	209,843.35	—	25,784.60	
Other Current Liabilities	4,250.00	4,250.00		.....
Total 7,095.17	13,513.42	—	6,418.25	
Total \$7,519,657.25	\$7,848,746.11	—	\$329,088.86	
<i>Deferred Liabilities:</i>				
Other Deferred Liabilities	\$120,465.36	\$237,404.77	—	\$116,939.41
<i>Unadjusted Credits:</i>				
Tax Liability \$473,333.10	\$635,508.52	—	\$162,175.42	
Insurance and Casualty Reserve 60,251.50	.....	+	60,251.50	
Accrued Depreciation— Equipment 27,708,909.06	26,354,312.52	+	1,354,596.54	
Accrued Depreciation— Road 140,470.00	.....	+	140,470.00	
Other Unadjusted Credits	193,295.57	289,567.20	—	96,271.63

Total

<i>Corporate Surplus:</i>				
Additions to Property through Income and Surplus.				
Investment in Road and Equipment	\$57,471,546.11	\$57,601,020.75	—	\$129,474.64
Improvements on Leased Railway Property ...	11,236,459.65	10,835,582.92	+	400,876.73
Investment in Miscellaneous Physical Property .	6,257.07	6,255.07	+	2 00
Total	\$68,714,262.83	\$68,442,858.74	+	\$271,404.09
<i>Profit and Loss:</i>				
	\$23,766,132.18	\$21,223,492.21	+	\$2,542,639.97

Grand Total

Grand Total\$217,289,076.83 \$215,485,690.07 +\$1,803,386.78

[ADVERTISEMENT]

Colorado & Southern Ry. Co.—Thirtieth Annual Report

Chicago, January 2, 1929.

TO THE STOCKHOLDERS OF THE COLORADO AND SOUTHERN RAILWAY COMPANY:

Herewith is submitted the Thirtieth Annual Report of your Board of Directors for the year ended December 31, 1928, setting forth composite income statement and statistics of operation for Colorado and Southern Lines included in this report. Balance sheets, income account and other statements of the several companies comprising the Colorado and Southern Lines are shown separately in the report of the Comptroller.

Comparative Statement of Income Years Ended December 31

Percent of Ry. Oper.	Rev. 1928	RAILWAY OPERATING REVENUES	1927	Percent of Ry. Oper.
79.54	\$20,408,781.82	Freight	\$21,100,597.14	77.53
12.84	3,293,730.66	Passenger	4,080,246.50	14.99
1.95	500,484.93	Mail	463,801.16	1.71
2.18	558,468.39	Express	588,389.55	2.16
2.25	577,014.02	All other transportation	597,408.59	2.19
.96	246,578.80	Incidental	300,279.10	1.10
.28	72,676.09	Joint facility	86,848.61	.32
		Total railway operating revenues	\$27,217,570.65	100.00
100.00	\$25,657,734.71			

RAILWAY OPERATING EXPENSES		
Maintenance of way and		
14.74	\$3,780,995.29	structures
15.96	4,096,138.36	Maintenance of equipment
1.67	429,719.38	Traffic
31.49	8,078,803.28	Transportation
.67	171,687.54	Miscellaneous operations
3.84	984,470.91	General
		Transportation for investment
Cr. 51	Cr. 130,092.89	Credit
67.86	\$17,411,721.87	Total railway operating expenses
	\$20,184,050.48	74.16
32.14	\$8,246,012.84	Net revenue from railway operations
		\$7,033,520.17
		25.84
	\$1,660,055.74	Railway tax accruals
	5,339.88	Uncollectible railway revenue
		27,709.31
	\$6,580,417.22	Railway operating income
	Dr. 411,089.77	Hire of equipment—Net
	Dr. 171,757.40	Joint facility rents—Net
		Dr. 174,369.65
	\$5,997,570.05	Net railway operating income
		\$4,936,717.43
		OTHER NON-OPERATING INCOME
	\$93,388.14	Miscellaneous rent income
		Dividends and miscellaneous
	531,462.30	interest
	4,036.66	Miscellaneous income
	\$628,887.10	Total other non-operating income
		\$794,340.94
	\$6,626,457.15	Gross income
		\$5,731,058.37
		OTHER DEDUCTIONS FROM GROSS INCOME
	\$3,613.82	Miscellaneous rents
	2,370,562.50	Interest on funded debt
	4,623.96	Interest on unfunded debt
		Amortization of discount on
	31,115.78	funded debt
	12,513.42	Miscellaneous income charges
	\$2,423,429.48	Total other deductions from gross income
		\$2,452,452.64
	\$4,204,027.67	Net income
		\$3,278,605.73
		DISPOSITION OF NET INCOME
	\$1,610,872.20	Dividends
		\$1,611,146.32
	\$2,593,155.47	Income balance
		\$1,667,459.41

Note:—1927 figures revised to compare with 1928 basis of accounting.

General Operations Revenues:

Total Operating Revenues for 1928.....	\$25,657,734.71
Total Operating Revenues for 1927.....	27,217,570.65

Decrease \$1,559,835.94—5.73%

This decrease is made up as follows:

Freight	Decreased	\$691,815.32—3.28%
Passenger	Decreased	786,515.84—19.28%
Mail	Increased	36,683.77—7.91%
Express	Decreased	29,921.16—5.09%
Switching	Increased	19,754.10—4.92%
Other Transportation Revenues.....	Decreased	40,148.67—20.50%
Incidental Operating Revenues.....	Decreased	67,872.82—17.53%

Net Decrease \$1,559,835.94—5.73%

A comparison of tonnage by commodities with 1927 shows a net decrease as follows:

Products of Agriculture	Decreased	18,011 tons—1.11%
Animals and Products	Increased	11,900 tons—4.03%
Products of Mines	Decreased	549,567 tons—12.93%

Products of Forests	Decreased	63,403 tons—13.87%
Manufactures and Miscellaneous	Decreased	73,364 tons—3.46%
Less-than-carload tonnage	Decreased	9,863 tons—6.63%

Total Tonnage Decreased 702,308 tons—7.90%

A comparison of carloads shows:

Total Cars (all commodities) in 1928.....	262,545 cars
Total Cars (all commodities) in 1927.....	279,424 cars

Decrease in 1928 16,879 cars—6.04%

The decrease in freight revenues was mainly due to a short cotton crop in Texas, to the curtailment of mining of coal and iron in Colorado and Wyoming, and to a reduced crude petroleum movement.

Unfavorable weather conditions caused a shortage in the cotton crop, and also in the hay crop in Colorado. A reduced acreage of sugar beets in Colorado and Wyoming, resulting from a controversy between the Sugar Company and the growers, caused a decrease in tonnage of that product. On the other hand, wheat and feed crops showed an increased tonnage, but not of sufficient volume to offset the large decrease in the movement of cotton, hay and sugar beets.

The curtailment of mining of coal and iron was caused in the case of coal, by labor troubles in the early part of 1928, and by the continued increased use of natural gas and oil for fuel. Natural gas from the Amarillo field is now supplied to the city of Denver and to the cities in the southern part of the state, and together with fuel oil, has decreased the use of coal in the steel plant of the Colorado Fuel & Iron Company at Pueblo.

Operating Statistics:

Tons of revenue freight carried—1928.....	8,186,319
Tons of revenue freight carried—1927.....	8,888,627

Decrease 702,308—7.90%

Revenue tons one mile—1928.....	1,565,759,882
Revenue tons one mile—1927.....	1,605,890,529

Decrease 40,130,647—2.50%

Revenue tons per train mile—1928.....	592.35
Revenue tons per train mile—1927.....	552.84

Increase 39.51—7.15%

Revenue tons per loaded car—1928.....	24.23
Revenue tons per loaded car—1927.....	24.40

Decrease17—.70%

Revenue passengers carried—1928.....	643,427
Revenue passengers carried—1927.....	814,803

Decrease 171,376—21.03%

Revenue passengers carried one mile—1928.....	99,827,693
Revenue passengers carried one mile—1927.....	121,831,760

Decrease 22,004,067—18.06%

Average distance carried—revenue passengers—1928.....	155.15
Average distance carried—revenue passengers—1927.....	149.52

Increase 5.63—3.77%

Expenditures (Operating):

Total operating expenses—1928.....	\$17,411,721.87
Total operating expenses—1927.....	20,184,050.48

Decrease \$2,772,328.61—13.74%

The decrease in operating expenses in 1928 was due to the return to normal activities after the very large general maintenance program of 1927, when old rail was released for the construction of the South Plains line and new rail was laid, together with extensive improvement to roadbed. The program of 1927 also included heavy repair and rebuilding of freight and passenger cars, which is reflected in less cost of repairs in 1928. The transfer of twenty-six engines in good repair from the Chicago, Burlington & Quincy Railroad reduced maintenance of locomotive costs for the year. Other items of operating expenses show decreases in harmony with the decline in business and revenues.

Expenditures (Capital):

There was expended during the year 1928 chargeable to Capital Account:

For Road	Cr. \$4,687,517.92
For Equipment	379,547.28
For General	100,529.55

\$4,408,500.19

During the past year the Company has benefited greatly by the efficient service rendered and loyalty shown by its officers and employees, and the management hereby expresses its appreciation of the interest thus shown in the welfare of the Company.

Following herewith is the report of the Comptroller.

By order of the Board of Directors.

FREDERICK E. WILLIAMSON,
President.

RAILWAY AGE

Financial News

(Continued from page 1181).

Hire of freight cars—Dr.	223,124	195,966	27,158
Joint facility rents—Dr.	5,702	6,439	—737
Non-operating income	31,057	30,501	556
GROSS INCOME....	653,238	540,454	112,784
Rent for leased roads	62,504	67,160	—4,656
Interest on funded debt ..	210,563	212,813	—2,250
TOTAL DEDUCTIONS FROM GROSS INCOME	529,993	503,655	26,338
NET INCOME	123,245	36,799	86,446

TEXAS & NEW ORLEANS.—*Lease.*—This company has applied to the Interstate Commerce Commission for authority to make a new lease of the property of the Texas State Railroad, for 20 years from January 1, 1929, on a rental basis of 50 per cent of the net railway operating income.

WABASH.—*Acquisition of Control.*—The Interstate Commerce Commission has authorized this company to acquire control of the Lake Erie & Ft. Wayne by the purchase of capital stock. A joint application of the New York Central and the New York, Chicago & St. Louis to acquire control of this line was denied. The Lake Erie & Ft. Wayne has 1.58 miles of main track, 3.2 miles of side track and 41 acres of land suitable for industrial development at Ft. Wayne, Ind.

WHEELING & LAKE ERIE.—*Acquisition of Control.*—The Interstate Commerce Commission has assigned for hearing on June 5 at Washington the application of the New York, Chicago & St. Louis for authority to acquire control of the W. & L. E. and the Lorain & West Virginia. The Pittsburgh & West Virginia, which also has pending an application for authority to acquire control of the Wheeling, has filed a motion in opposition to the petition of the Nickel Plate for leave to intervene in the proceedings on its application. It takes the position that the Nickel Plate has no standing before the commission until it has complied with the order to divest itself of its 17 per cent of the Wheeling stock.

WHEELING & LAKE ERIE.—*Annual Report.*—The annual report of this company for 1928 shows net income after interest and other charges of \$4,364,748, as compared with net income of \$2,394,833 in 1927. Selected items from the income statement follow:

	1928	1927	Increase or Decrease
RAILWAY OPERATING REVENUES	20,705,664	18,129,586	2,576,078
Maintenance of way	2,539,198	2,375,000	164,198
Maintenance of equipment ..	4,523,822	4,653,947	—130,125
Transportation. 5,802,265	5,684,225	118,040	
TOTAL OPERATING EXPENSES ...	13,868,383	13,716,571	151,812
Operating ratio	66.98	75.66	8.68
NET REVENUE FROM OPERATIONS ...	6,837,281	4,413,016	2,424,265

Railway tax accruals	1,679,494	1,462,571	216,923
Railway operating income	5,154,886	2,948,769	2,206,117
Equipment rents —Net	176,124	93,283	82,841
Joint facility rents—Net ..	2,926	5,968	—3,042
Non-operating income	482,967	460,649	22,318
GROSS INCOME...	5,637,853	3,409,418	2,228,435
Interest on funded debt..	845,652	878,103	—32,451
TOTAL DEDUCTIONS FROM GROSS INCOME	1,273,105	1,014,584	258,521
NET INCOME.....	4,364,748	2,394,833	1,969,915

WESTERN PACIFIC.—*Annual Report.*—The annual report of this company for 1928 shows net income after interest and other charges of \$613,278, as compared with net income of \$394,851 in 1927. Selected items from the income statement follow:

	1928	1927	Increase or Decrease
RAILWAY OPERATING REVENUES	17,594,075	16,433,463	1,160,612
Maintenance of way	3,344,713	3,084,060	260,653
Maintenance of equipment ..	3,011,619	2,949,422	62,198
Transportation. 6,044,422	5,393,342	651,081	
TOTAL OPERATING EXPENSES ...	14,206,209	13,125,069	1,081,140
Operating ratio	80.75	79.87	.88
NET REVENUE FROM OPERATIONS ..	3,387,866	3,308,394	79,472
Railway tax accruals	1,171,177	1,503,477	—332,300
Railway operating income	2,215,799	1,804,114	411,685
Equipment rents —Cr.	93,074	284,620	—191,546
Joint facility rents—Cr. ..	272,137	232,749	39,388
Non-operating income	2,328,334	2,218,749	109,585
GROSS INCOME...	4,544,134	4,022,864	521,270
Rent for leased roads	3,200	3,000	200
Interest on funded debt	2,288,656	2,137,962	150,694
TOTAL DEDUCTIONS FROM GROSS INCOME	3,930,856	3,628,013	302,843
NET INCOME	613,278	394,851	218,427

Average Prices of Stocks and of Bonds

	Last May 14	Last week
Average price of 20 representative railway stocks.	129.73	130.96
Average price of 20 representative railway bonds..	91.15	91.64

Dividends Declared

Alabama Great Southern.—Ordinary, \$2.00; Ordinary, Extra, \$1.50, both payable June 28 to holders of record May 24. Preferred, \$2.00; Preferred, Extra, \$1.50, both payable August 15 to holders of record July 11.

Catavissa.—Preferred, \$1.15, payable May 22 to holders of record May 11a.

Chicago, Rock Island & Pacific.—Common, \$1.75, quarterly; 6 per cent Preferred, \$3.00; 7 per cent Preferred, \$3.50; all payable June 29 to holders of record May 31.

Cleveland & Pittsburgh.—Guaranteed, \$.87 1/2, quarterly; Special Guaranteed, \$.50, quarterly, both payable June 1 to holders of record May 10.

Pittsburgh, Bessemer & Lake Erie.—Preferred, \$1.50, payable June 1 to holders of record May 15.

St. Louis-San Francisco.—Common, \$2.00, quarterly, payable July 1 to holders of record June 1.

Southern Pacific Company.—\$1.50, quarterly, payable July 1 to holders of record May 24a.

Union Pacific.—Common, \$2.50, quarterly, payable July 1 to holders of record June 1.

Chicago & North Western.—Common, \$2.00, semi-annually; Preferred, \$3.50, semi-annually, both payable June 29 to holders of record June 3.

New York, New Haven & Hartford.—Common, \$1.00, quarterly; Preferred, \$1.75, quarterly, both payable July 1 to holders of record May 31.

Officers

Executive

J. A. Caviezel, general manager of the Alabama, Tennessee & Northern, with headquarters at Mobile, Ala., has been appointed vice-president and general manager, in charge of operation, with the same headquarters. John T. Cochrane, Jr., general freight agent in charge of solicitation, with headquarters at Mobile, has been appointed vice-president and traffic manager, in charge of traffic, with the same headquarters.

E. A. Frost, president of the Huttig, Mansfield & Nacogdoches Railroads, with headquarters at Shreveport, La., has also been elected chairman of the board of the newly organized Louisiana & Arkansas which has taken over the operation of the Louisiana & Arkansas of Arkansas and the Louisiana Railway & Navigation Company. Harvey C. Couch, president of the old Louisiana & Arkansas, with headquarters at Shreveport, La., and Pine Bluff, Ark., has been elected president of the new company. Other officers of the old L. & A. who were elected to similar positions in the new company include B. S. Atkinson, senior vice-president, Shreveport; W. C. Ribenack, executive vice-president, Shreveport and Little Rock, Ark.; C. P. Couch, vice-president, Dallas, Tex.; C. S. McCain, vice-president, New York; J. A. McCain, vice-president, Texarkana, Ark.; C. G. Lunday, vice-president and general manager, Minden, La., and L. Garrett, secretary, Pine Bluff. Paul Sippel, first vice-president of the Louisiana Railway & Navigation Company, has been appointed assistant to the senior vice-president, with headquarters at Shreveport. E. A. Staman, second vice-president of the L. R. & N., has been elected treasurer, with headquarters at Shreveport.

Norris P. Ballou, assistant to the chairman of the railroad committee which negotiated the purchase of the American Railway Express Company by the Railway Express Agency, has been appointed assistant to the president of the latter company. Mr. Ballou was born in Denver, Colo. During the war with Spain he served with the Second United States Volunteer Cavalry. He attended school in Philadelphia and was graduated from Yale University with the degree of Ph.B. with the class of 1904. In 1907 he received the degree of LL.B. from the New York Law School and was admitted to the New York Bar in the same year. During the World War he served with the Bureau of Military Intelligence, Port of Embarkation, New York. In 1920 he joined the Association of Railway Executives as assistant to the chairman, having charge of various matters, among them the transfer operations by which the railroads acquired some \$300,000,000 worth

of equipment from the government. Later he was assistant to E. N. Brown as chairman of the Revolving Fund Committee. During this time he also handled matters pertaining to the uniform contract of the railroads with the American Railway Express Company, and, in the past few years when the change in the manner of handling express business was under consideration, he devoted all of his time to the work of the railroads' express committee under the chairmanship of W. B. Storey.

Charles L. Hinkle, general manager of the Chicago Great Western, has been elected vice-president in charge of operation, a newly created position, with headquarters as before at Chicago. Mr. Hinkle has been in railway service for 50 years. He was born on May 16, 1866, in Indiana and entered railroad service at the age of 13 years as a water boy in the bridge and building department of the Evansville & Terre Haute (now a part of the Chicago & Eastern Illinois). His first promotion was to laborer in a stone mason's gang and he was then advanced successively to telegraph operator, station agent, chief clerk in the mechanical department and general store-keeper. During 1905 and 1906 he served as traveling auditor on the Evansville & Terre Haute and from 1906 to 1912 he acted as assistant to the general manager and as assistant to the vice-president of the combination made up of the Chicago & Alton, the Toledo, St. Louis & Western (now part of the New York, Chicago & St. Louis) and the Minneapolis & St. Louis. In the latter year



Charles L. Hinkle

Mr. Hinkle was promoted to superintendent of the T. St. L. & W., with headquarters at Frankfort, Ind., then in 1914 being further promoted to general superintendent, with headquarters at the same point. At the outbreak of the World War he accepted the commission of major in the Transportation Corps of the United States Army, serving until 1919 as general superintendent of the Fifteenth Grand Division in France. Shortly after the signing of the armistice he was appointed general manager of the army transportation activi-

ties in France being awarded, for his war services, the ribbon of the Legion of Honor of France and the insignia of the American Distinguished Service Medal. He was honorably discharged from the army with the rank of colonel and on May 1, 1920, was appointed general manager of the Chicago Great Western. Mr. Hinkle's election to vice-president became effective on May 6.

Financial, Legal and Accounting

L. A. Harkness, general auditor of the Illinois Central, has been promoted to assistant comptroller, with headquarters as before at Chicago, succeeding **Walter D. Beymer**, deceased. **R. E. Kimbell**, auditor of miscellaneous accounts, has been promoted to general auditor, to succeed Mr. Harkness. The position of auditor of miscellaneous accounts has been abolished.

Operating

Thomas R. Murphy has been appointed trainmaster of the Erie, with headquarters at Dunmore, Pa., succeeding F. O. Plummer, transferred.

W. R. Davis has been appointed superintendent of the Delaware division of the Pennsylvania, succeeding **R. P. Graham**, who has been appointed superintendent of the St. Louis division, with headquarters at Terre Haute, Ind.

L. J. Higgins, assistant superintendent of the Midland Valley and the Kansas, Oklahoma & Gulf, has been promoted to superintendent of transportation of the two railroads, with headquarters at Muskogee, Okla.

A. H. Cavanagh, assistant superintendent of the Canadian National, with headquarters at Hamilton, Ont., has been appointed superintendent of the Hornepayne division, with headquarters at Hornepayne, Ont., succeeding **J. E. Nelson**, deceased.

E. O. Saltmarsh, superintendent of the Pensacola division of the Louisville & Nashville, with headquarters at Pensacola, Fla., has been promoted to assistant to the general manager, with headquarters at Louisville, Ky. **E. W. Speed**, freight agent at Pensacola, has been promoted to superintendent of the Pensacola division to succeed Mr. Saltmarsh.

E. W. Perrott, superintendent of freight transportation of the Western region of the Pennsylvania, has been appointed supervisor of service in the same region, with headquarters at Chicago. **R. P. Graham**, superintendent of the Delaware division, with headquarters at Wilmington, Del., has been transferred to the St. Louis division, with headquarters at Terre Haute, Ind., to succeed **K. R. Vought**, who has been transferred to the Baltimore division, with headquarters at Baltimore, Md. Mr.

Vought replaces **George M. Smith**, who has been appointed general agent and superintendent at Baltimore.

John K. Johnston, who has been appointed assistant general superintendent of the Pennsylvania, with headquarters at Tyrone, Pa., was born on May 8, 1860, at Pleasant Unity, Westmoreland County, Pa. He was educated in the public schools and Greensburg Academy and entered railroad service in May, 1880, with the Pennsylvania. He served as rodman in the engineering department on the Corps engaged in the location and construction of branch lines in the Connellsville coke region and later was engaged in the construction of



John K. Johnston

branch coal and coke lines in Southern Pennsylvania. In January, 1885, he was appointed assistant engineer of construction of the Schuylkill Valley Railroad (part of the Reading) and in 1887, he was appointed assistant engineer of maintenance of way of the Pennsylvania at Altoona, Pa. From 1888 to 1897, Mr. Johnson served as supervisor at various points and on the latter date he was appointed assistant engineer of the Middle division, with headquarters at Renovo, Pa. From January to August, 1900, he served in the same capacity on the Schuylkill division, then being transferred in the same position to Harrisburg, Pa. In November, 1902, he was appointed principal assistant engineer at Altoona, Pa., and the following year was appointed superintendent of the Tyrone division, with headquarters at Tyrone, Pa. From 1917 to 1918, he served as superintendent of the Philadelphia division at Harrisburg, returning to the Tyrone division in February, 1918, and serving in that capacity until May 1, 1929.

Traffic

J. A. Marmion, assistant general freight agent on the Southern Pacific, at Houston, Tex., has retired because of ill health, after nearly 40 years of railway service.

Graham C. Woodruff, assistant freight traffic manager of the New York Cen-

tral, with headquarters at New York, has resigned from that position and has been elected chairman of the U. S. Freight Company.

E. W. Long, assistant general freight agent of the Seaboard Air Line, with headquarters at Charlotte, N. C., has been appointed assistant freight traffic manager, with headquarters at Norfolk, Va. **L. P. King** will succeed Mr. Long as assistant general freight agent at Charlotte.

George M. Smith, general agent and superintendent of the Pennsylvania, with headquarters at Baltimore, Md., has been relieved of the duties of superintendent of the Baltimore division in order that he may devote his entire time to the direction of the company's general interests in Baltimore. **K. R. Vought**, superintendent of the St. Louis division, with headquarters at Terre Haute, Ind., has been appointed superintendent of the Baltimore Division, with headquarters at Baltimore, Md.

H. A. Weaver and **G. B. Wood**, general freight agents of the Kansas City Southern, have been promoted to freight traffic managers, with headquarters as before at Kansas City, Mo. Mr. Weaver will have charge of tariffs, rates, divisions and matters pertaining thereto with other railroads while Mr. Wood will be in charge of solicitation. **J. R. Mills**, assistant general freight agent, with headquarters at Kansas City, has been promoted to assistant freight traffic manager, with headquarters at the same point. **L. V. Beatty**, assistant general freight agent, with headquarters at Kansas City, has been promoted to general freight agent, with the same headquarters. **J. O. Hamilton**, assistant general freight agent at Texarkana, Tex., has been promoted to general freight agent, with headquarters at the same point.

Earl W. Ireland, who has been promoted to general passenger agent of the Chicago Great Western, with headquar-



Earl W. Ireland

ters at Chicago, has been in the service of that company for nearly 21 years. He was born on August 8, 1884, at Buckley, Ill., and entered railway serv-

ice in April, 1904, as a ticket seller on the Illinois Central. Later he was connected with the Chicago & Western Indiana at the Dearborn station, Chicago, entering the service of the Great Western as assistant city passenger agent at Chicago in November, 1908. Mr. Ireland was advanced through various positions in the passenger department at Chicago and on July 15, 1925, he was promoted to general agent. On January 16, 1929, he was further promoted to assistant general passenger agent, with headquarters at Kansas City, Mo., where he remained until his promotion to general passenger agent on May 1.

J. E. Davis, who has been promoted to assistant to the freight traffic manager of the Union Pacific system, with headquarters at Omaha, Neb., has been in railway work for 27 years. He was born at Franklin, Ind., in 1884 and entered railway service in 1902 on the Cleveland, Cincinnati, Chicago & St. Louis at Franklin. He served in various local office positions with the Big Four at Franklin, Cairo, Ill., Indianapolis, Ind., and Connorsville, then being advanced to chief clerk in charge of the



J. E. Davis

local office at the latter point. In 1906 he became a bookkeeper in the local office of the Southern Pacific at Portland, Ore., later being advanced to chief revising clerk, where he remained until September, 1908, when he was appointed rate clerk on the Oregon-Washington Railroad & Navigation Company at Portland. With the latter road he served in the general freight office in various capacities, including chief tariff clerk, and assistant chief clerk in charge of rates and tariffs, until June 1, 1922, when he was promoted to assistant general freight agent at Portland. Mr. Davis' promotion to assistant to the freight traffic manager became effective on April 14.

L. C. Bouchard, who has been promoted to general freight and passenger agent of the Southern Pacific in Texas and Louisiana, with headquarters at Dallas, Tex., has been in the service of that railroad for nearly 22 years. He was

born at New Orleans, La., on March 16, 1890, and after attending High school entered railway service as a clerk in the local freight office of the Southern Pacific at that point. From 1907 to 1913 Mr. Bouchard was advanced successively through the positions of telegraph operator, bill clerk, accountant, was local agent, chief clerk to the division freight and passenger agent and tariff inspector. In 1914 he was further advanced to traveling freight and passenger agent, a position he held until 1916 when he was appointed commercial agent at Lit-



L. C. Bouchard

tle Rock, Ark. During 1918 and 1919, Mr. Bouchard acted as assistant general agent in the steamship department of the Southern Pacific then being promoted to general agent at Memphis, Tenn., in 1920. In 1927 he was appointed office manager of the Southern Pacific traffic department at Chicago, a position he held until his promotion to general freight and passenger agent at Dallas.

Mechanical

R. M. Nugent, road foreman of engines on the Chicago & Alton at Slater, Mo., has been appointed master mechanic of the Illinois Terminal system, with headquarters at Alton, Ill.

Following the removal of the repair shops of the National of Mexico from Durango, Dgo., **G. J. Alvardo**, master mechanic, has been appointed assistant master mechanic at that point.

W. D. Arter, master mechanic of the New York Central, with headquarters at Watertown, N. Y., has been appointed master mechanic at Corning, N. Y. The position of master mechanic at Watertown has been abolished and the duties have been assumed by the division superintendent of motive power. **A. D. Bingman**, master mechanic at Utica, N. Y., has been transferred in the same capacity to Harmon, N. Y. **G. W. Caley**, master mechanic at Corning, N. Y., has been transferred in the same position to Utica, N. Y.

F. J. Swanson, general car foreman on the Eastern lines of the Chicago, Milwaukee, St. Paul & Pacific at Chicago, has been promoted to district master

car builder, with headquarters at Minneapolis, Minn. Mr. Swanson has been connected with the Milwaukee for nearly 25 years. He was born at Chicago on February 15, 1889, and entered railway service on December 26, 1904, as a record clerk on the Milwaukee. During the following 13 years he was advanced successively through the positions of M. C. B. clerk, storekeeper, timekeeper, car repairer, inspector and assistant foreman



F. J. Swanson

at the Galewood (Ill.) shops. On October 1, 1917, Mr. Swanson was promoted to car foreman at the Galewood shops where he remained until March 31, 1925, when he was further promoted to general car foreman in charge of the Chicago Terminal district. He remained at the latter point until his promotion to district master car builder of the Northern district, with headquarters at Minneapolis,

Obituary

Dr. T. W. Huntington, chief surgeon of the Western Pacific, with headquarters at San Francisco, Cal., died at the Dante sanatorium in that city on April 19.

E. M. Fairfield, assistant to the executive vice-president of the Chicago, Burlington & Quincy, with headquarters at Chicago, died on May 3 at St. Luke's hospital in that city.

George W. Conway, who retired as general storekeeper of the Louisville & Nashville, in May, 1928, died at his home in Louisville, Ky., on March 15. He had been in the service of the Louisville & Nashville for nearly 47 years.

William J. Greene, master mechanic of the Duluth, Missabe & Northern, with headquarters at Proctor, Minn., died at his summer home at Solon Springs, Wis., on May 10, following an illness of several weeks.

Percy Werner, who was assistant general counsel of the Ohio & Mississippi (now part of the Baltimore & Ohio) from 1883 to 1886, died at St. Louis, Mo., on April 28 at the age of 72 years. Mr. Werner had also been general coun-

sel and secretary of the American Refrigerator Transit Company from 1888 to 1898 and for a time was general counsel of the Associated Car Companies.

William Doherty, for many years a railway officer, financier and real estate operator in Texas, died at his home in Houston, Tex., on May 8 at the age of 65 years. Mr. Doherty was born at Killybegs, Ireland, and entered railway service in the United States in the '80's. In 1887 he became a weigh master at the Gulf, Colorado & Santa Fe freight station at Fort Worth, Tex. Later he served successively as chief clerk to the general agent of the Santa Fe at Fort Worth, as city passenger and ticket agent at that point, as traveling freight and passenger agent for the Houston, East & West Texas (now part of the Southern Pacific) at Houston, as assistant general passenger agent for the latter road and as general passenger agent and then traffic manager of the St. Louis, Brownsville & Mexico (now part of the Gulf Coast Lines) at Corpus Christi, Tex., and Kingsville. In 1912 Mr. Doherty was appointed assistant general manager of the New Orleans, Texas & Mexico (now part of the Gulf Coast Lines), with headquarters at Kingsville. He had also been for a time a vice-president of the Waco, Beaumont, Trinity & Sabine. Lately he had been engaged in various business and real estate enterprises and at the time of his death he was actively interested in the proposed construction of a railroad between Houston and Port Arthur.

Col. Wells Howard Blodgett, former vice-president and general counsel of the Wabash, died at his home in St. Louis, Mo., on May 8, at the age of 90 years. He was born at Downers Grove, Ill., on January 27, 1839, and graduated from the Illinois Institute at Wheaton, Ill., being admitted to the bar in 1861. During the Civil War, from 1861 to 1865, Colonel Blodgett served successively with the Union forces as a private, as a lieutenant of the Thirty-seventh Illinois Infantry, as a captain, as judge-advocate of the Army Frontier with the rank of major of cavalry, as lieutenant colonel and as colonel of infantry. In 1862 he was awarded the Congressional Medal of Honor for gallantry at Newtonia, Mo. From 1866 to 1872, Colonel Blodgett served in the House of Representatives and in the Senate of Missouri and in 1873 he was appointed assistant attorney for the St. Louis, Kansas City & Northern (now part of the Wabash). The following year he was promoted to general attorney and in 1879 he was appointed general solicitor of the Wabash, St. Louis & Pacific (now the Wabash), then becoming general counsel for the receivers of the Wabash Lines in 1884. Upon the reorganization of the Wabash in 1889 he was appointed general solicitor and in 1901 he was elected vice-president and general counsel. From 1911 until his retirement from active service in 1915, Colonel Blodgett

was general counsel for the receivers of the Wabash.

Clifford L. Nichols, former general manager of the lines of the Northern Pacific east of Paradise, Mont., with headquarters at St. Paul, Minn., died of blood poisoning at the Northern Pacific hospital in that city on May 12, after an illness of four days. Mr. Nichols retired from active duty in 1927. He was born on November 30, 1856, at Wyanet, Ill., where he entered the service of the Chicago, Burlington & Quincy at the age of 15 years. Later he served as chief dispatcher on the Atchison Topeka & Santa Fe at Emporia, Kan., as trainmaster at Topeka, Kan., and as division superintendent at Fort Madison, Iowa. For a short time during 1888 he was general superintendent of the Elgin, Joliet & Eastern, with headquarters at Joliet, Ill., and for the following five years he served successively as a dispatcher on the Chesapeake & Ohio at Huntington, W. Va., as a dispatcher on the Missouri-Kansas-Texas at Sedalia, Mo., and as chief dispatcher on the Chicago, Rock Island & Pacific at Horton, Kan., and Blue



Clifford L. Nichols

Island, Ill. In 1893 Mr. Nichols was promoted to division superintendent on the Rock Island, with headquarters at Blue Island, where he remained until 1903 when he was transferred to Fairbury, Neb. From 1904 to 1912 he served successively as superintendent of the Chicago, Cincinnati & Louisville (now part of the Chesapeake & Ohio) at Richmond, Ind., and at Peru, Ind., and as general superintendent at Cincinnati, Ohio, as division superintendent on the Chicago Great Western at Des Moines, Iowa, and as superintendent of the Montana division of the Northern Pacific at Livingston, Mont. In 1912 Mr. Nichols was promoted to general superintendent of the Northern Pacific, with headquarters at St. Paul, and in June, 1919, he was further promoted to assistant general manager at the same point. He was promoted to general manager in December, 1921, and retired from active service in January, 1927. His active railroad service had covered a period of nearly 56 years.